Re-designing Greenstone for Seniors

Erin K Bennett

This thesis is submitted in partial fulfillment of

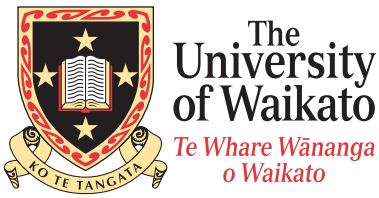
the requirements for the degree of

Master of Science

at the

University of Waikato.

Department of Computer Science



Hamilton, New Zealand

February 2007 — February 2008

Abstract

The golden generation have a wealth of experience and knowledge from throughout their lifetimes that younger generations wish to retain. In our technology filled world an obvious means of collecting this information is electronically. Digital library collections are increasingly used by libraries and large institutions to record their large amounts of information but they can also be used for personal collections.

Seniors are often willing and keen to impart their years of experience upon people of the younger generation but time is not always on their side as they grow older. Throughout a lifetime a person could collect large amounts of papers, diaries, photos and media but the time it takes to organise these documents can be long and exhausting and the person's health is not always at its best in old age.

Greenstone is a suite of software for creating digital libraries, which are organised collections of documents. Greenstone has the ability to distribute collections either using a server or CD-ROM, and provides advanced searching and organization tools. While Greenstone is a versatile and useful tool in creating digital collections, its interface is not designed for senior users. Seniors are commonly perceived to have more physical and mental disadvantages as they get older. These disadvantages can dramatically affect how usable seniors find a piece of software.

The aim of this thesis is to investigate how usable the current Greenstone interface is for use by seniors and to re-design the interface so that Greenstone may be more easily used by senior users. This thesis focuses upon what types of documents and descriptive data seniors would like to include in a collection about their life. This is to ascertain exactly what parts of the interface must be improved when it comes to metadata and classifiers. The results of this investigation also helped in the creation of a customised metadata set for senior users use.

Acknowledgments

I would like to thank Professor Sally Jo Cunningham for her untiring advice, support and exceptional proof reading throughout my research and thesis.
Thanks should also go to Dan Hawthorn for his extensive research into the area of senior usability and interface design. I would also like to thank Margaret Richardson for providing me with advice, resources that I would otherwise be lacking.

I must also give my appreciation to the School of computing and Mathematics at the University of Waikato, and specifically thank Dave Nichols, Ian Witten, Lyn Hunt and Kirsten Thomson. The department has been a great help in my research and the production of my thesis.

I would also like to thank my participants and their families for their contribution to this research. Now senior users can create wonderful collections using Greenstone. I must also thank the following groups for their help in participant recruitment; Hamilton SeniorNet, NZ Genealogical Society, Hamilton Genealogy society.

Lastly I must thank my family and friends for their support and encouragement throughout the last year. In particular I would like to thank my parents, Janet and Martin, my sister Megan and finally the person who has supplied the biggest support, my partner Jimmy Foulds. I would not be here if not for your constant support and patience.

List of Tables

List of Figures

Contents

Chapter 1

Introduction

In the current technological age that we are living in, we see on a daily basis tasks that were previously performed on paper and in person being performed using computers, such as banking, voting, genealogical research etc. In this thesis I am going to discuss a suite of software called Greenstone which takes a previously paper based task and makes it digital. The Greenstone software is used to create digital collections of documents which are easily organised and searchable.

As we move forward into the new millennium with computers at our sides we seem to be forgetting our grandparents' generation and their relative lack of technology experience. The senior generation has a wealth of knowledge and experience that many people would like to capture. However it is a long process sorting through a life's collection of papers, books, photos and more. What can make the task of archiving a person's life harder is if the person is no longer around to add more information than what is collected in the documents. What if the senior themselves could put together the collection of their life, and in the process impart more information.

However seniors have some obvious difficulties with technology, these might be mobility issues, sight issues, cognitive disabilities or they may be slow to learn how to use a piece of software. This can mean that future generations may lose valuable information which the senior generation wish to pass on.

With the readily available equipment used to digitize documents, such as OCR capable scanners, photocopiers and digital cameras gathering documents together for a digital collection is no longer such a long and cumbersome process.

The intention of this thesis is to describe how to re-design the Greenstone software so that it is easier to use for senior users, hopefully eliminating the issues I have just mentioned.

In the second chapter of this thesis I will discuss previous literature in the area of seniors usability of computer interfaces. In addition I will describe aspects of senior

usability testing that can impact the effectiveness of a study.

Then in the third chapter I will cover the Personal Collection Study, the aim of which was to ascertain the types of documents that a senior user would want to add to a collection about their life, the type of descriptions that they would want to include with their documents and how they would like to organise their collections. The fourth chapter describes the current Greenstone Librarian Interface while in the fifth chapter, I will discuss the second study that I performed in the fifth chapter, the Greenstone Usability study. This study was designed to discover which parts of the existing Greenstone Librarian Interface (GLI) were a problem for seniors users. The aim is to then infer the design changes necessary to make Greenstone usable for senor users.

Then chapter six deals with the design changes implemented, and a discussion of the new Senior Greenstone Librarian Interface (GLI). I will cover each panel of the interface and discuss the changes that were made, as well as talk about the implications these changes will have. The next two chapters then discuss the metadata set that I created specifically for senior users and the timeline classifier I created for viewing documents in a collection. Finally I will summarise all the work done in the conclusions chapter and how usable I expect this new system to be by senior users. The last chapter is some suggestions on further work in the areas of Greenstone usability and senior user usability.

Chapter 2
Literature Review - Interfaces for Senior Users

2.1 Introduction

Senior users have different needs regarding interfaces than your average adult aged 18-60 . These needs can vary widely but are never insurmountable. It is important to keep in mind that the saying 'You can't teach and old dog new tricks' [4] is simply a saying and senior users can learn how to use new software. This chapter will cover the six main problem areas for senior users and interface design. These problem areas are discussed extensively in works by many authors that are cited. In particular a large amount of research has been done by Dan Hawthorn and each of the problems areas that will be discussed below are discussed in more detail in his phD [11] thesis. The following section is only a summary of the finding of others and further reading regarding these topics can be found in the following; Zajiceck [19], Hawhtorn [10], Hawthorn [7], Hawthorn [8] and Stephanidis [16].

2.2 Sight and perception

With increasing age a persons sight can deteriorate. This deterioration can come in many forms, and commonly involves a combination of types of deterioration. Amongst seniors there are high incidents of long sightedness which can lead to issues with depth perception. There are also more instances of poor colour discrimination amongst seniors than other age groups. Poor colour discrimination can mean that the person has trouble telling the difference between two colors, similar to colour blindness but not as severe. The most common colour discrimination issues amongst seniors regard the blue and green ranges of the colour spectrum. This suggests that

senior users have trouble discerning the difference between blue and green colours and contrasts of each colour, i.e. light blue vs medium blue [11]. Because of this difficulty with colour discrimination it is best to use colours from the other end of the colour spectrum.

Another aspect of deteriorating eyesight in seniors is visual acuity, which is the ability to detect fine detail such as text and fine lines. As with colour discrimination this decreases with age. Further implications regarding visual acuity are discussed in Hawthorn [11]. To counteract poor visual acuity, fine detail such as the twirl at the beginning of the letter W in Figure 2.1, should be avoided and well lit environments, such as bright computer screens, used so that fine detail can be seen. As visual acuity decreases, the users ability to read small text diminishes, but the average font size (12pt) is not too small for the general senior user. Morell[14] suggested the use of the font sans-serif with a text size of between 12 and 14 points. This is to reduce fine detail and in turn make reading of the text easier.

Seniors depth perception, the ability to gauge the depth or distance of an object,

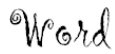


Figure 2.1: A word which a user with poor visual acuity may have trouble with

is also affected by age and therefore their spatial recognition skills (as discussed in Yanagisawa and Akahori[18]), can become diminished. This can have the implications that the user may have trouble recognising and interacting with 3D objects in comparison to 2D objects. Therefore it is best to not use 3-dimensional objects in an interface that is designed for seniors, but instead to use 2-dimensional objects (as demonstrated in figures 2.2 and 2.3).

Senior users also have difficulty adapting to changes in lighting. This could also

Figure 2.2: 3D Button

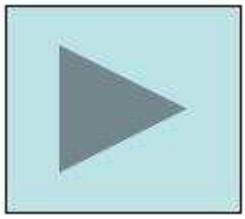


Figure 2.3: 2D Button

affect colour changes if a change is from a dark colour to a bright colour and vice versa. Therefore it is best to keep colour changes, such as those between interface windows, to only a few shades and colours so as to reduce adaption time. A senior's ability to search the interface for a specific item (Visual Search) also slows with age. Any inessential object that may clutter the interface is advised against so that the interface is easy to search and simplified. Some objects, such as icons can be confusing to senior users as the user has to interpret the icon [15]. Their interpretation of the icons depends upon their personal experience and as this is not uniform for any group of users, icons should be very simple (such as a camera indicating photos, or book indicating a book) or should be removed and replaced with explicitly worded representations.

A person's ability to see an image embedded within an image is another factor that decreases with age. This ability is closely related to visual acuity and mainly affects a users ability to recognise and interpret icons. As icons are usually designed to convey some information and often contain multiple images, they can be a source of trouble for senior users, so it is best to limit or simplify icons within an interface. A senior users ability to recall actions and instructions reduces with age. However if simplified and well explained tasks are used then recall is much easier. In terms of an interface this means it would be best to design the transitions between each task and feature as simply and transparently as possible so as to aid in later recollection. Visual search, is another factor in the reasoning for a consistent interface layout. Critical areas, a location where important objects appear, is central to how a user interface is designed. If the placement of objects in a user interface is consistent then there is little need for the user to expand their knowledge of the interface as they view each new window or page [1] because critical areas are always in the same place. With age a persons ability to discern high pitched noises begins to deteriorate, and senior users will generally find higher pitched noises harder to hear. Any alert noises should be me made low pitched and loud so as to be sure that the user hears them. The field of vision in which a user can see diminishes with age and as a result their peripheral vision is reduced. The implications here would be that the user interface is best viewed when centered in the page, and it is best to not have important information or options at the extremity of the window.

2.3 Motor Control

With age a persons movement, such as clicking a button when prompted, can become slower and less precise. With less control of their mobility, senior users can have trouble clicking on a small target and can often overshoot the target. The issue of precision can be overcome through the use of larger targets (buttons, panels, dialog boxes) and bigger spaces between targets. A seniors coordinated movement can also be diminished, so it is best to keep targets easily accessible on the screen, such as keeping options from being embedded inside other options i.e. File → Properties → Editing → Font. It is easier for seniors to navigate to an option when getting a result does not require a coordinated action beforehand. For example in Fig 2.3 the user has to keep the mouse level as they move it horizontally across the screen to reach the Greenstone Library Interface. If the users mouse accidentally drops below or rises above the Greenstone3 digital Library Software v3.03 target then the user will have trouble opening the Greenstone Librarian Interface. To counteract this, larger targets are useful, but it is best to avoid such situations wherever possible.

Figure 2.4: Image of where precise motor control is needed

2.4 Memory

It is commonly accepted that as we age our ability to remember decreases. However we have different types of memory and not all decrease at the same rate. Working memory is commonly referred to as short-term memory and is crucial in the use of software. Working memory helps the user remember what task they are currently performing, where they have just navigated from and what their intention or task is now. Semantic and procedural memory are also required for effective memory of processes and actions. The semantic memory deals with retention of such things as

terminology, ideas and structures, whereas procedural memory deals more with the long term memory of actions and processes, such as how to move a mouse or where the back button is on a browser. There are more types of memory, but they are not so essential to using computers and interfaces [12]. A senior users ability to use working memory does decrease with age and therefore it is best to introduce new objects and ideas gradually and repeat them multiple times so as to store the technique in the procedural memory. Older users are often slower at recalling information from working memory, and this can mean that very recently learnt techniques are the hardest to recall, but in time they can be recalled.

Recalling a process from procedural long term memory also becomes more difficult with age. However recognition of previous exercises is not greatly affected, it is just harder to remember the process itself. Therefore it is best to keep tasks similar and repetitive so the user does not have to recall a specific process, and instead remembers by association. Senior users learn much faster how to perform a task if they have to repeat the task many times. Seniors also have a more difficult time in suppressing irrelevant information when trying to recall a specific piece of item. For example the a senior may be trying to remember the exact location of a favourite shop when a friend says it is around the corner from the supermarket. The extra information can break up the senior's memory process as now they have to think where the supermarket is and relate that to their favourite store.

2.5 Attention

In Hawthorn [11] he makes a reference to Plude and Hoyer's(1986) definition of attention 'in terms of the capacity or energy to support cognitive processing'. A senior user's attention can be affected if a task takes a long time and is complicated, however their attention can usually be retained through good explanation and communication. As mentioned previously seniors have less ability to inhibit irrelevant actions or information. Top-down plans of actions can usually confuse the user more and is not suggested, instead keep the user moving linearly across the interface. A seniors multi-tasking ability is greatly reduced especially when complex tasks are required. Another factor in decreasing dual task performance is the anxiety level of

the user, however this is hard to counteract in an interface.

2.6 Cognitive Abilities

A common effect of age is a slowing in the cognitive processes of the brain. This can affect the user's reasoning ability and their decision making. This in turn impacts how quickly and effectively they can find an item in an interface. As with all users, no matter age, a person performs a task better if the interface has a consistent design and layout so that common objects are in a consistent position. However this is more critical in regards to senior users as their cognitive processes are slower that the average adult aged 18-60.

Not all sight disabilities in senior users are due to deterioration of the eye. Slowing of the receptors in the brain can affect how quickly information travels from the eye and gets processed in the brain. This means that a user may be able to view a fast moving object but the receptors in their mind may not have time to process what they saw. They can see the object, but not understand it. An example of this may be a message that scrolls across the screen. If the message scrolls faster than they can process it in their mind, they can become confused and agitated. Therefore any moving text should be made stationary and any other movement of images or objects (such as progress bars) should be altered so that the process can be observed and interpreted. These alterations may include slowing the object down so that the user may observe the object or in the case of a progress bar, increasing the length of the bars representing the progress so that they are easier to observe.

A senior user's cognitive ability can be greatly affected by age. The most common effects are to their reasoning abilities. Senior users can have a harder time with the reasoning and understanding of an idea or process. This means that clear, concise instructions are needed to ensure the user fully understands the process. While a senior user's ability in mental processing is affected by age, it is most commonly just slower and so patience is needed when dealing with senior users.

2.7 Learning

The process of using a piece of software often requires the user to learn how to do certain actions and to retain knowledge of these actions. It also requires the user to learn new terms that can be either technological words or common language terms. This learning process is often a difficulty for senior users as they can have a particular difficulty memorising tasks and terminology. However these items to be remembered can be crucial to the use of the software. Here is a serious factor when designing a system for use by seniors.

It is true that, as a group, senior users do learn and perform at a slower rate, however the rate of deterioration is not universal within this group. As everyone is an individual with separate experiences and talents, there are obvious variations in their ability to learn new information. For example, for the studies discussed later in this thesis (Chapters 3 and 3) the participants had to have moderate computer experience as a requirement (see appendix B for a definition of moderate computer experience). However this did not prevent an expert computer user (many years experience) taking part in the studies. The expert computer user may find it easier to learn how to perform a new task as they have had experience with learning new tasks on computers. However someone who only just qualifies as having moderate computer experience may have a great deal of trouble learning a new task. The expert user just described is referred to as having Expertise skills, which is described in Fisk and Rogers [5] as a type of memory where the person is exceptionally good a their specific skill and they have adapted their ability with this skill to overcome any age related issues. In the example just given the user's skill is in computer experience through years of computing. The speed at which a senior user learns varies from person to person and it is best to pace the process with each user's own limits. In addition senior users seem to learn better from learning in small groups (2-4 people [11]) than individually or in large groups.

2.8 General

The senior generation has a habit of blaming themselves when something goes wrong. Hawthorn [9] describes this tendency as the ”’silly old me”’ syndrome’ that is used as a coping mechanism for when a problem arises. This point of view seems to leave seniors with a view that they are substandard with computing, and blame needs to be attributed correctly so as to not reinforce this mindset that they were the cause of the problem.

A point to keep in mind is that the issues described above may not affect all seniors. Some of the issues may affect some senior users, others may have no issues. None of the effects described are uniform, they can appear at different severities and different rates.

2.9 Study considerations

A lot of the affects of aging on interface design that have been covered above can apply in areas other than interface design. In regards to running usability studies, many of these guidelines can be carried through.
A quick change of focus for the eye can be distracting for a senior user as their eyes are slower to adjust to changes in brightness. Therefore, it is best to keep study instructions either on the computer or read verbally to the user. The constant changing of focus from paper instruction to the screen may make the user feel uncomfortable and affect in turn this can affect the results of the study.

If a senior user is in a stressful or anxiety ridden situation, their recall ability can be dramatically longer and less accurate. This again can affect the results of the study as they will not be performing at their peak if they are stressed or uncomfortable. Keeping senior users as comfortable as possible is key when performing usability studies with seniors. If using a computer efforts should be made to make sure that the users chair is the correct height, that their screen and keyboard tray are comfortable and that screen resolutions and brightness are comfortable. These adjustments can put the user at ease and make the study an enjoyable experience

which can make the user more forthcoming and talkative.

Hawthorn ([9], [3]) discusses the preference of senior users to have a researcher run the studies who is of a similar age to them. This not only applies to study setting but in any teaching settings. However this gap can be breached if the researcher is not of a similar age by using humour and anecdotes. I discuss this later in Chapter 3. However it is important to realise that younger generations tend to talk and work faster and can become impatient with delays on simple tasks. Any such behaviour should be avoided as it can stress senior users and affect the study.

The final thing to mention about interface design with seniors is that not all of the age related issues described above will affect a single user. In fact one user may have none of these issues while another may have many of them. It is important to keep in mind that no person is the same and that any of the issues described should be treated with patience and kindness. This can put the participant at ease and make the study much nicer for both participant and researcher.

Chapter 3

Analysis of collections senior users would create

3.1 Introduction

When I first started looking at the difficulties senior users would have with Greenstone I very quickly focused upon metadata. Metadata is a common term in the academic world however it can be a confusing concept for your average person who has not encountered it before. Research suggests that senior users have even more difficulty with learning new concepts than your average adult user under the age of 60. This suggests that senior users could have a great deal of difficulty with the concept of metadata (descriptions of documents).

In Greenstone the metadata set that is used in the collection is selected at the creation of the collection. This metadata set can be changed later on through a moderately complex process. In this section we will discuss the default metadata set, Dublin Core. From there I will discuss how I hoped to ascertain what metadata senior users would most likely include with their collections so that a customised metadata set can created as an alternative to the Dublin Core set.

3.2 Dublin Core metadata

This metadata set was originally created in Dublin, Ohio, (U.S.A). It was set up as a standard set of metadata elements that can be used to describe a resource. This set of elements can be expanded upon and reduced, however it is widely seen as a good basis when describing resources.

Dublin Core [17] contains fifteen metadata elements which are the "core" elements used when describing a document. This useful and appropriate standard means the user does not have create their own metadata set for every collection, but it also presents some difficulties with senior users. As we have explored in Section 2.4, senior users can find it confusing and distracting when there is extra, unnecessary information or options. As Dublin Core contains some elements which I predicted would be very seldom used, such as: Coverage, Identifier and Contributor, I decided to perform a study to test which are the most likely elements to be used by a senior. These elements are unlikely to be useful as they have what seniors would term as technical names. The purpose of them is not immediately obvious, for example; identifier could be used to identify the type of document, an object or subject of the document or it could be a complex number representing the document. This ambiguity in meaning is very confusing to a senior user.

3.3 Aim of the study

I wanted to find out what descriptors each participant would like to add to documents in their collection. These descriptors were to be of their choosing so I decided to not influence them with existing elements from the Dublin Core metadata set. Instead I aimed to find out in their own words how they would describe documents. The overall purpose of this study is to discover what items senior users would like to organise into a collection that represents their lifes work or their hobby and what metadata they would include for these documents.

3.4 Design of the study

The participants were instructed to collect around six items every few days over a period of two weeks. The target number of six items every few days was given to them as this study was not aimed at finding out the volume of documents, and it was felt it was best to not take up too much of the participants time. For each of the six items they were to write a description of the item on a sticky note and attach the sticky note to the item (it was suggested to place the sticky notes on the backs

of photos as the adhesive may harm older photos). The user was to then place the item in a Keepsake box so that none were misplaced.

If an item was large or awkward to place into the Keepsake box or they did not wish to remove the item from its current residence then they were to write a description of the item on a sticky note and place it into the scrapbook and make a note of where the item is so that it can be discussed in the final meeting.

During the two weeks the participants were contacted after three days, seven days and 14 days, to assess whether they were having any trouble understanding the instructions or if they had any particular trouble. The participant would be contacted by phone or email and if they had trouble then a face-to-face meeting was arranged.

After the two weeks a final meeting was arranged where the participant and researcher discussed each document and description. Together the participant and researcher constructed a diagram of how the user would like their collection to appear. The intention of this task was to discover what type of classifiers 8.4 senior users might want to include in collections they create. The expected result of this task was a revised list of the existing classifiers of Greenstone taking into account which ones are unnecessary.

At the end of the final meeting the participants were asked to fill in a demographic questionnaire (appendix C). The study was designed carefully so that the participants' time was not monopolized by the study. As the participants had the materials with them for the entire two weeks, there was the possibility that they might feel obligated to work on the study whenever they had free time, so a limit to number of documents to be collected every few days was used. When designing the study the aim was to find out the types of documents and types of metadata that a senior user would use in a collection. The users were not told directly what was expected of them as it easy felt that this might influence their collections. Instead the method of discovering which metadata the user would use on their documents was disguised as asking the participant to write a description. These descriptions contained many metadata elements that can be used to infer the metadata elements for a senior collection.

The types of documents presented some interesting results. Before the study I had hypothesized that the most common type of document would be paper, such as letters or diaries. However the study showed that the participants had a very large

number of photographs. The participants were instructed to ignore how the documents would be converted into a digital equivalent and just collect items that they would like to put into their life's collection. I had assumed that a few objects could not be converted to digital equivalents objects, such as trophies, would be collected, but to m surprise every user had an at least two objects of this description. In particular one participant included their cat, and another included their dog in the collection; these are most definitely not possible to digitize.

As described in the study outline, contact was maintained with the participants throughout the study so as to ascertain if there were any problems. At the predetermined intervals I contacted each of the participants and while almost all participants needed reassurance that they were doing the study correctly and that they would have enough documents, no participants required a face-to-face meeting.

This suggests that then participants have a lack of confidence in a new task, but they follow instructions well. This is behaviour is repeated in the later study and is a fundamental occurrence in seniors learning.

3.5 Participants

The participants were selected from seniors groups and the general public via posters and email lists. For this study I wanted a wide range of users so I advertised for participants in the greater Waikato and bay of plenty regions of New Zealand. For the study I ended up with five participants, three males and two females. I had always intended the study to be a small study as the results I was looking for were not specific, such as what are usability issues as described in the second study (Chapter 5). For this reason I felt that five participants was more than enough to get the results I required.

3.5.1 Participant A

When studying the results of the study, in regards to the descriptions on the sticky notes, I took into account such things as length of descriptions and the different types of metadata. This participant had rather short descriptions, none more than

a few sentences long. This could suggest that they prefer short and to the point information. When I considered the content of their sticky notes I discovered a lot of dates. This metadata, while provided for in existing metadata sets, is obviously important to this user. When they did include dates they lacked in text descriptions. For example, if a photo had the date that the photo was taken written down then there would not be any kind of explanation of who was in the photo. This exclusive metadata suggests that the user prefers to keep to one kind of description or metadata element for each document.

While the sticky notes may have been lacking some detail, the scrapbook that they were provided for sticky notes for documents they did not have, made up for this lack. The front of the scrapbook was full of detailed descriptions of lots of items, some that were described on sticky notes and some not. This user had appeared to have used the scrapbook as a diary to record events and documents that they did not have in great detail.

This participant had 35 documents, ranging from books to photos to albums (photo and other) and more shown in 3.1. The most common type of document that this participant had was photographs. The participant had 17 photographs from throughout their life and one photograph album. This users documents mostly consisted of text documents, with quite a few books, diaries and manuals included. Copyright could be an issue for a lot of these as they are printed books, archiving these books would have to be a selective process which takes copyright into consideration.

The final result that was analyzed from this study was the design of the participants collection overview that was created by the researcher and participant. The intention of this overview was to find out how the participant would like their collection organised. The final out lie is shown below 3.1 and demonstrates how they had decided upon a horizontal view. The important result in this diagram is how the [participant has grouped 'family and life' and 'family friends' together. This grouping is possible in Greenstone and is a good example of how metadata can be used in the organisation of a collection. An example of the types of documents that this participant collected can be viewed in Figure 3.2.

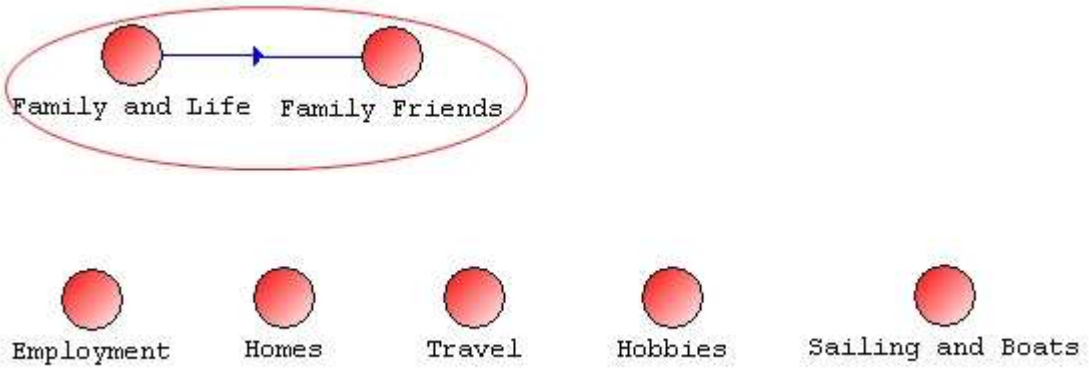


Figure 3.1: Participant A's collection overview

Figure 3.2: Participant A's documents

3.5.2 Participant B

For this participant there were only thirteen sticky notes completed, which is a small number in comparison to the rest of the participants in the study. While this is a comparatively small number of descriptions, there were a handful of documents that were added at the last minute and therefore lacked description. This participant wrote long descriptions on their sticky notes and in the case of one note they even wrote on the back. This brought to my attention a problem I had not foreseen before this study, that the length of room provided might influence the length of the description the participant writes. However this participant found a way around this problem by writing on both sides of the note. When I discussed this with the participant they mentioned that they could have written more but ran out of room

on the sticky note.

When looking at the types of documents that this participant added to their collection I found a very large proportion of the documents were photographs. In fact, almost their entire collection consisted of photographs. While the table of the types of documents does not show that this user had any documents that were classed as 'other', they in fact did. The classifications show in table 3.1 were decided upon after the study as the participants collections were being analysed. At the last minute, just as the meeting was finishing the participant ran off and fetched a camera that they had decided to add to the collection. This shows that the participant is not confined to just the documents they had collected before the meeting, and that no firm assumptions should be made about the types of documents a senior participant won't add to a collection.

When arranging this participant's collection overview (diagram 3.3) the were adamant about how they wanted the collection organised, and while other participants in this study preferred the researcher to write the little sticky notes for the diagram, this participant wanted to do it themselves. The final layout was a very linear layout with a progression from left to right. A note to mention about their layout is that they had no sections which overlapped, which suggests that if the collection was recreated in Greenstone then metadata assigned to an entire folder is unlikely to be used. An important fact to note is that the participant used a mixture of text and dates to identify the documents. This is important to note as there is no classifier currently in Greenstone that can deal with such an organisation effectively. A selection of the documents that this participant collected can be seen in figure 3.4.

3.5.3 Participant C

Participant C took to the study a little differently than other users. Instead of writing descriptions on the sticky notes and then attaching the sticky notes to the objects or putting them in the book, this user used the sticky notes to number the items. Then in the book they described what each item was and included the number they had written on the sticky note.

This was an interesting variation to the designed method but worked just as well

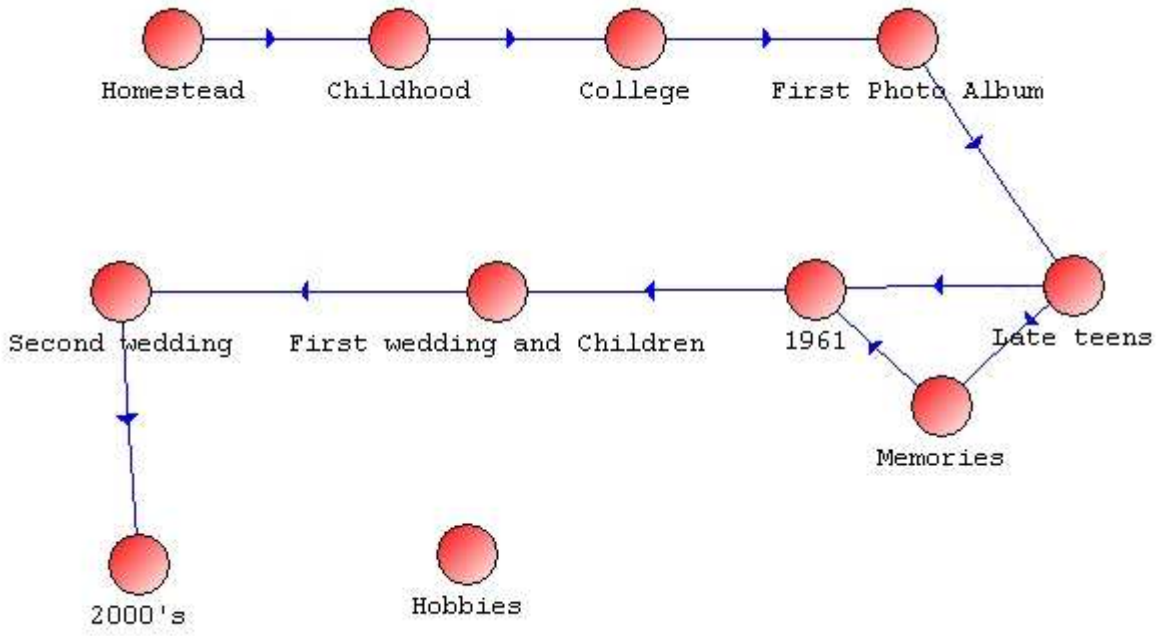


Figure 3.3: Participant B's collection overview

Figure 3.4: Participant B's documents

for the purposes of this study.

This user had a variation of long and short descriptions for their documents. Some descriptions could be a few words long, and others were over a paragraph in length. This shows how senior users might prefer a large amount of space for their descriptions so that they can write as much or as little as the like. This participant had

a unique way of completing the study. Instead of writing their descriptions on the sticky notes they wrote their descriptions in the scrapbook and numbered them they then used the sticky notes to mark each document with the correct number. Had the user not used their method of writing the descriptions directly into the scrapbook then some of their descriptions would have undoubtedly been longer than the space provided on the sticky note. This is a useful piece of information as the study was designed to ascertain the types of descriptions the user would like to write about their collection and it was taken for granted that the sticky note would provide enough space for writing their descriptions. This user, like others, made frequent mentions of dates and ages (figure 3.6), suggesting that the date classifier in Dublin Core is an essential metadata element. This user also mentioned locations and landmarks in their descriptions. These locations were in relation to photographs and mentioned landmarks, such as down the road from the homestead. This is a value not accounted for in the Dublin Core (DC) metadata set and may be a consideration for a custom metadata set.

This participants collection consisted mostly of text documents, such as certificates and awards and photographs. However their second most common document type was in other. The other item in this participants collection were in fact badges, medals and awards.

The collection overview for this user 3.5 was in fact quite complicated. There were many overlapping sections, and unlike other participants they did not have a linear layout. They had their documents ordered in a circle so as to allow sections to overlap. This is a good example of how sections work in Greenstone. If a document has two values for a single metadata element they in fact overlap the metadata sections.

3.5.4 Participant D

This user used very short and concise notes; all their notes consisted of about one to two sentences. They had very specific dates and age values, that were commonly used. Their descriptions contained about two to three sentences of descriptions that included mixtures of dates and text. An interesting feature about how this participant wrote their descriptions is that they wrote them in relation to themselves,

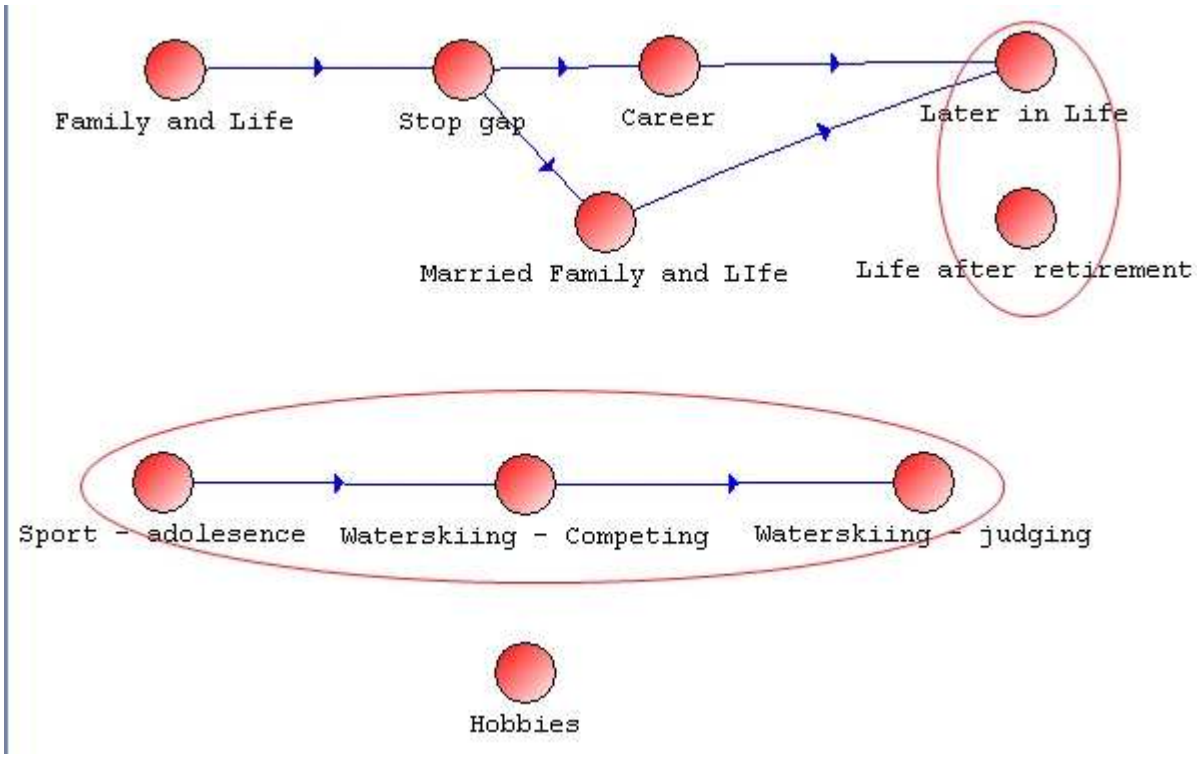


Figure 3.5: Participant C's collection overview

Figure 3.6: Participant C's documents

such as 'My most treasured picture of my dog'. The description could contain more information about the dog but almost every documents description had that personal relationship with the participant. This is a good example of keeping documents and collections relative to the person they are about.

The most common document in this participants collection was again photographs. Photographs seem to be the most commonly occurring document in this study and could suggest a trend that can affect the classifiers in Greenstone. The participants collection overview was very simple, and again demonstrates the preference for a linear layout that the participants of this study have. There is one example of overlapping of sections 3.7.

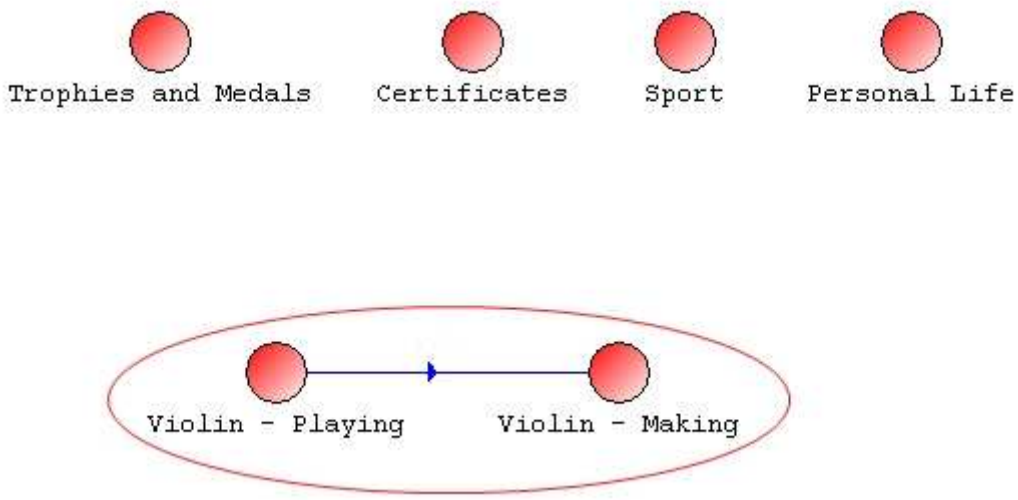


Figure 3.7: Participant D's collection overview

3.5.5 Participant E

The participant explained at the beginning of the study that had a great many hobbies and kept intricate records of them. After discussing with the participant about how much work it would involve in organising these records for the study they decided to base their collection upon their life instead of their hobbies, but include aspects of their hobbies.

The descriptions of their documents typically took up about two thirds of the space on the sticky note and. Unlike some of the other participants, this participant had very few occurrences of dates and almost none of ages in their descriptions. Most of

Figure 3.8: Participant D's documents

the descriptions were a brief overview of the item, such as a title, and some mention of relevance. This relevance had two points of view; one was a relevance to the participant and the other wax a relevance to other documents in the collection.
The types of documents that this participant included in their collection, as seen in their collection overview (figure 3.9) were most commonly paper (table 3.1). This is where this participant starts to separate from the other participants of this study. While photographs were their second most common type of document, paper documents were their first with around 13 paper documents in the collection.

3.6 Results

The information I was looking for in this study was to find out what types of documents senior users would like to collect and what types of descriptions they would write about documents. These results can have large effects on how to re-design Greenstone. The types of documents that seniors would like to add to a collection helps to determine the plugins that should be pre-packaged with Greenstone. It can also have implications as to the types of classifiers and metadata that the user would have in the collection. If senior participants prefer to write descriptions about various aspects of a document, such as location, date and people in the photos, then a

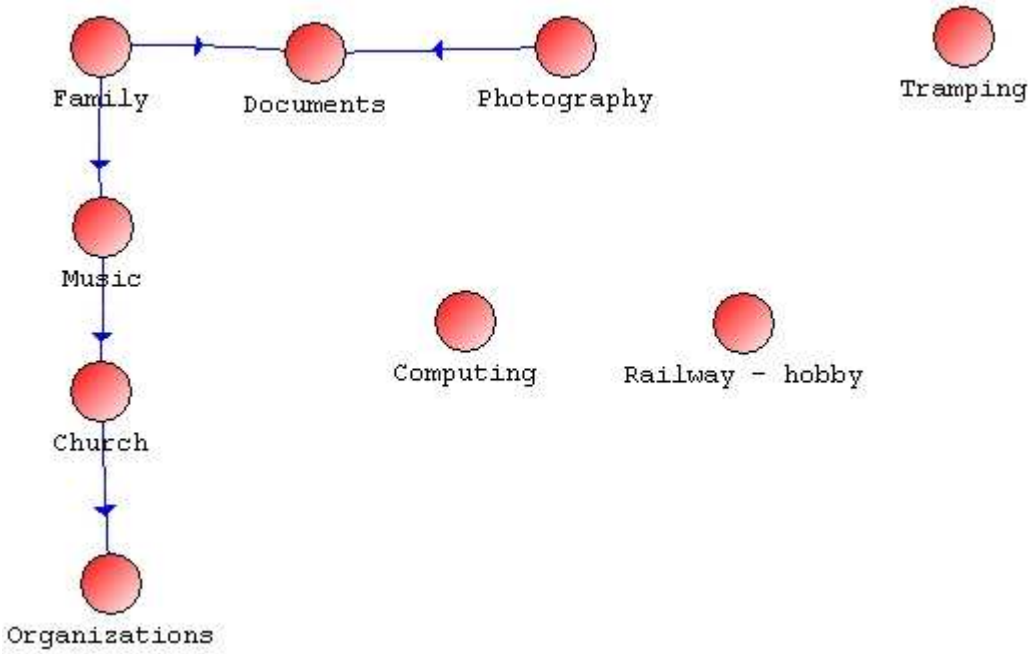


Figure 3.9: Participant E's collection overview

Figure 3.10: Participant E's documents

custom metadata set has to be considered as there is no element in the Dublin Core metadata set that relates to 'people in photo'. The use of metadata is instrumental in searching non-text documents and organising collections. The current part of the interface that deals with metadata may be an issue for seniors but by having these descriptions we can predict the best size of text boxes and even create and easier to use metadata set for senior users.

The table above 3.1 shows the number of each document that the participants collected. It shows that the most common type of document was photographs but was

Table 3.1: Participants documents statistics

Participant	Book	Photo	Album (photo or other)	Other	Paper	Video
A	12	17	1	5	0	0
B	3	27	5	1	1	0
C	3	22	1	11	4	0
D	0	18	1	11	13	0
E	6	7	0	3	13	1

closely followed by 'other'. The other classification can represent anything document that is not able to be converted into a digital format, and in this study the 'other' documents were typically awards and medals. Interestingly, only one participant had a video document, this was a VHS tape.

3.7 Metadata

The metadata results from this study provide a mountain of useful information. The most common type of metadata used by the users was general text descriptions. Parts of these descriptions can be represented in Dublin core metadata terms. For examples, many of the photographs in this study had dates on them, Dublin Core has a date field that can relate directly to this. Another example of this is when the participant had included their Bible and their description contained something along the lines of 'My first Bible'. Dublin Core has a title metadata element that relates to this description as well. These descriptions were of varying lengths but would in general require a good 2-3 lined box for the users to be able to type their description without having to scroll along the page multiple times. The next most common metadata element was dates. These were extremely common in the descriptions, and often ages were used along with dates. The use of ages was a new occurrence that was not covered by the Dublin Core metadata set. This reinforces the need for a more specialised metadata set for senior users. As mentioned in Participant B's review 3.5.2 it was discovered that the size of the sticky notes started to impact upon the length of the descriptions that the participants would write. This is an interesting fact that could have implication in the GLI (Greenstone Librarian Interface) as only one line is provided for each metadata elements, although more can be written as the text scrolls across the page. The other useful piece of information I found out

from this study was that most participants wanted to organise their collections in a timeline fashion, but most of the time they did not have dates to use. Some users used a mixture of dates and text identifiers, such as 'childhood' and 'family years', and other used only text identifiers. The current Greenstone interface can present some issues with organising the collections as there is no classifier that uses dates and text identifiers at the same time. This presented me with the idea to create a new specialised classifier called the 'Timeline classifier' which is discussed later in Chapter 8.

Types of documents

This study also produced a lot of results regarding the types of documents that users would like to add to the collection. While none of the documents that the users included in their collections would require specialised plugins, most users voiced a liking for the being able to add video and sound. Greenstone does have some issues with a few video formats so pre-packaged plugins for the most common types of video and audio files would be needed.

3.8 Demographic

These demographic statistics were obtained from the questionnaires that each participant filled out in their final meeting at the end of the study. The average age of the users for this study was 76. No user was younger than 65 as the minimum age for the first study was 65. This age barrier was decided upon as it is the official retirement age in New Zealand. In the Greenstone Usability study, chapter5 this age is revised down to 60 due to participant availability. The oldest user in this study was aged 83. One of the questions referred to how confident the user feels with their computer use. The users were asked to rate their confidence on a scale of 1 to 5. The average confidence rating was 3. This is the value that I expected. Previous research has suggested that senior users have issues with confidence, especially with learning and new tasks. This lack of confidence was mentioned to me by the users. When filling out the questionnaire many of the users would make a comment along the lines of "'I'm not very good with computers". The users were also asked to list how many years they had been using a computer. This result was expected to vary a lot as some users may have just started using computers while other may have used

computers during their careers or earlier years. The questionnaire revealed that the average years of computer use were 9.8 years. However one particular user had had 36 years of computer use. This may have skewed the results however when combined with the questionnaire results of the second study this may be corrected. Another question asked regarded the users use of a mouse. This question was included as senior users in general are known to have some mobility problems and a mouse can complicate any existing mobility issues. The users were asked to rank their ability to use a mouse on a scale of 1 to 5. The average rank was 4.2 showing that the users found the use of a mouse very easy. No user specified a rank under 3 suggesting that there are few issues with mobility.

3.9 Conclusion

Overall this study has revealed some interesting facts about the types of documents a senior user would add to a collection about their life, and also about the descriptions they would use for the items. The results show us that the most common type of document that senior users would like to add to the collection is text documents; however this is very closely followed by photographs and other images. This suggests that digitizing a persons collection may be a straightforward process as text and photos are fairly easy to digitize, especially with the advances in OCR (Optical Character Recognition, the process of translating hand written images into text). The most common type of metadata that was collected was a text description of the document. However we must assume that each document will also require a title so this as well must included as a common type of metadata (the little sticky notes tell us the title). However date came in a close second along with descriptions of who is in a photo and descriptions of the significance of an item. These are specialised metadata objects that are not currently accounted for in DC.

Chapter 4
The Greenstone Librarian Interface

Greenstone is a suite of software that is used to create customised digital libraries. A digital library can serve many purposes, such as a record of a person's photographs or publications, but they often serve educational purposes, such as providing education in third world countries. The Greenstone software has two major components to it. the first is the Greenstone Library which is a server that hosts completed collections (external servers can also be used). The second component is the Greenstone Librarian Interface (GLI). The GLI is the interface that a user creating a digital library uses.

In this chapter I will discuss the aspects of the GLI that relate to this thesis. I will not be discussing all features of Greenstone as it is an extensive suite of software; therefore I am focusing upon features that relate to the re-design of the GLI and to the Greenstone Usability Study.

4.1 Preferences

Greenstone already provides some options in customising the GLI interface. These options can be reached by going to the file menu then selecting Preferences. The Preferences window has four panes (similar to the panes discussed below); General, Mode, Connection, Warnings. The General pane contains options such as Users email, interface language and Font. These options are used to customise the GLI and are a very useful feature of Greenstone. The Mode pane contains four options that represent the different modes of the interface. Each mode specifies the set of options that are displayed in the rest of the GLI and each is different. The Assistant

mode is a simple mode that contains the basic features of the GLI and is best used when creating collections that are based upon an existing collection. This mode does limit how much the user can customise the final interface. The second mode is the Librarian mode and is the default mode for Greenstone as it contains the features normally used. The next mode is the Library Systems Specialist and this mode enables all the features of Greenstone and is suggested only for experienced users. The final mode is the Expert mode, and this mode is for the very experienced user as it includes some trouble shooting and use of PERL.

Opening a collection When opening an existing the collection the user can access all existing collections by going to the File menu and selecting Open this opens up another window that is split vertically. The top panel of this new window contains a list of all the existing collections on the computer, or server, depending on how the user is running greenstone. The user can click on a collection and the collections description is displayed in the lower panel of the window. Below the second window there are two buttons, Open and Cancel. The Open button opens the currently selected collection and the Cancel button closes the current window.

Creating a new collection If a user wishes to create a new collection then they go to the File menu and select the New option. A new window that has a series of fields for the user to fill in. The first field is for the collection title must be filled in. The second field is for the collections description. The next option is a combobox that allows the user to select a collection to base this collection on. This option sets up the new collection with the same metadata sets and appearance, such as classifiers (see later in this appendix) as with the collection selected. Finally the user is presented with two buttons, and OK button which when clicked will create the new collection, and a Cancel button which cancels the new collection and closes the current window.

4.2 Panes

The GLI has six panes, these are options located at the top of the applet, that each contain specific tools used in creating a digital collection. These panes are essential to the interface and are presented in what is known as a card view, similar to tabs used in browsers. The panes are: Download, Gather, Enrich, Design, Create and

Format. As I describe each pane it is important to keep in mind that I will be describing the options that are available in the Librarian mode as it is the default mode of the GLI.

4.3 Download

The download pane is used for the importing of documents from locations such as the web. It accommodated four different types of import, Web, OAI, Z39.50 and SRW. In my experience this is a seldom used pane as it is designed for the more advanced user. It presents different options for each type of import. For example, for the Web import it has fields for the URL and an option allowing the user to specify HTML pages only.

4.4 Gather

The gather pane is one of the crucial panes used in creating a digital collection. The tasks associated with this pane are addition and removal of documents to the collection and organisation of the documents. The pane uses a drag and drop feature that allows the user to move documents from the left hand side of the pane (the workspace tree which displays the documents on your computer) and the right hand side of the pane (the collection view which displays the documents in the current collection). The user can select single or multiple files and each tree has a filtering option so that they can filter out certain file types. This pane also has two buttons located in the bottom right of the pane. The first button is a Create new folder buttons which allows the user to create folders in the collection view and then using the drag and drop method the user can organise the documents into specific folders. The second button is a Recycle bin which allows the user to select a document and click the button, or alternatively the user can drag a document they wish to delete to the button. The user can only delete documents from the collection tree. The final options in this pane are the progress bar and its cancel button. The progress bar represents the progress of transferring a file or files from the workspace tree to the collection tree. The cancel button cancels the transfer of documents.

4.5 Enrich

The enrich pane is used to enter metadata for the documents in the collection. The pane is split down the middle, the left hand side of the page lists all the documents and folders in the collection and like the trees in the gather pane, also have a feature allowing the user to filter out specific documents. The right hand side of the page has a table and panel. The table is used to represent the metadata for the document and has two columns. The first column contains the name of the metadata element and the second column is a text field where the user can enter the metadata for that specific element for the selected document. Not all metadata value are editable, the extracted metadata that only appears in the table after the first build is not editable. The panel on the right hand side holds values that have been entered previously for the currently selected metadata element. The user can then click on the value they wish to enter and it is entered into the appropriate value text field in the table. This is to make entering of frequently occurring values much easier for the user. The last aspect of this pane is a button in the lower left side of the pane. This button is labelled Manage Metadata Sets and when clicked will open up the program Greenstone Editor for Metadata Sets which is part of the Greenstone suite of software. This program lets the user edit elements in the metadata set, assign and remove metadata sets from a collection and more.

4.6 Design

This pane, like the Enrich pane is split horizontally and is used to customise how the organisation of the collection works and appears. The left hand side of the page lists the options that you can change in this pane, they are; Document Plugins, Search Indexes, Partition Indexes and Browsing Classifiers. The document plugins feature provides the user wit the ability to add plugins for a particular type of document that tell Greenstone how to display that document type. It presents a list of plugins along with the ability to create new plugins. The Search Indexes feature lets the users specify what indexes (metadata element) the searches (text, form and advanced search) in the finished collection will search upon. The user can also specify whether options such as stemming and casefolding are used upon

the indexes. The Partition Indexes is a feature that is disabled in the Librarian interface but deals with searches and indexing across collections. The final option is Browsing classifiers. Classifiers are the way in which documents are displayed in the final collection. Using this feature you can specify a classifier to add to the collection, such as AZList which orders all documents from A to Z. Each classifier has their own options which can be set, but some common options are butonname, the name that is displayed in the collection, such as Titles.

4.7 Create

This pane is used to build the collection into a viewable, searchable entity. This pane, unlike the others is split vertically. The top half of the pane contains options that can specified for the build. One such option is the maxdocs feature which lets the user limit the number of documents that are added to the build, this feature is useful for big collections where the user just wants to see how the collection looks or see a new feature they have added, without having to wait for all documents have been added to the collection. The lower half of the page contains two panels. The first panel holds the build collection; cancel build and preview collection buttons as well as a progress bar showing the progress of the current build. This panel also contains two radio buttons that let the user specify if the build is a complete rebuild or a minimal rebuild. A complete rebuild is where the collection is completely rebuilt, whereas the minimal rebuild just rebuilds the sections of the collection that have changed. By default the complete rebuild option is selected. The final part of this pane is the lower panel which is where build information is printed. The build information contains such things as, which documents were added to the collection and which plugin was used to add them, as well as how many documents were added to the collection.

4.8 Format

The format pane is used to customise how features, such as classifiers are displayed in the collection. The Format pane has the same layout as the Design pane. The left hand panel contains the options which you can customise. The options are;

General, Search, Format Features and Translate Text. The General option provides fields that the user can fill in about the collection as a whole. These fields include creators and maintainers emails addresses, the collection title and folder that the collection is located in and the URLs to home and about page icons as well as the collection description. Some of these features are entered when the collection is first created, but this option allows the user to change them at a later date. The Search option allows the user to specify the names of the indexes that were assigned in the Design pane. These names are what appear in the drop down boxes in the collections search fields, such as titles and filenames. The next option is Format features which lets the user specify, using XML, how the metadata and icons for the documents appear in the fished collection. They can change the order of metadata, the font and more. The last option is Translate text. This option allows the user to translate sections of the finished collections interface into other pre-defined languages, e.g. you could change the Text Search title into the French alternative.

Figure 4.1: Current Greenstone Browsing Classifiers panel

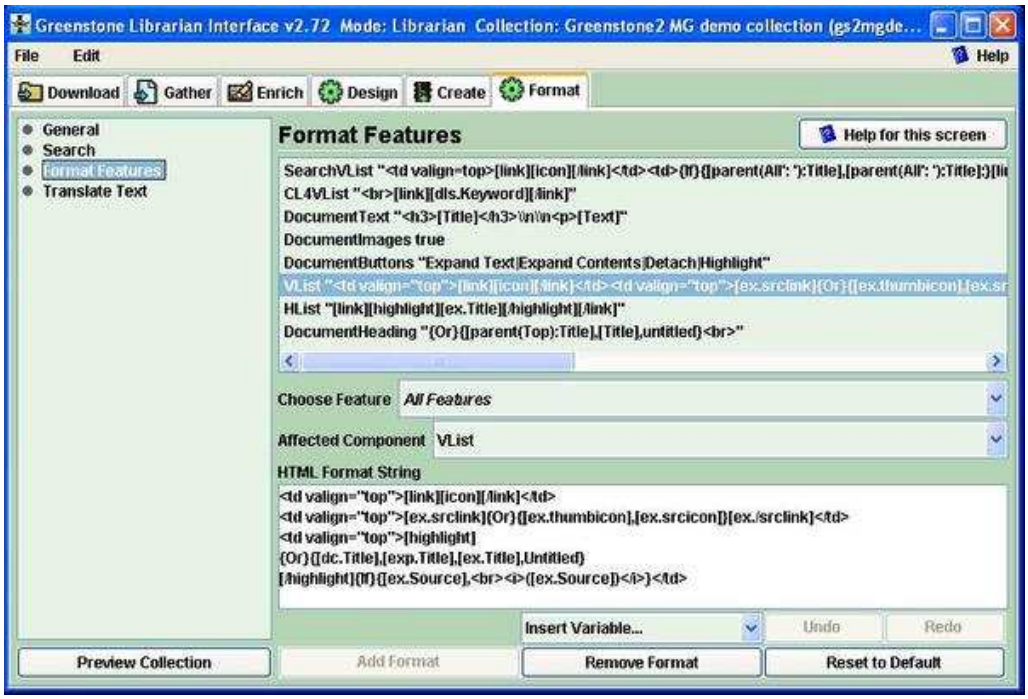


Figure 4.2: Current Greenstone Format pane

Figure 4.3: Current Greenstone Preferences window

Figure 4.4: Current Greenstone General panel

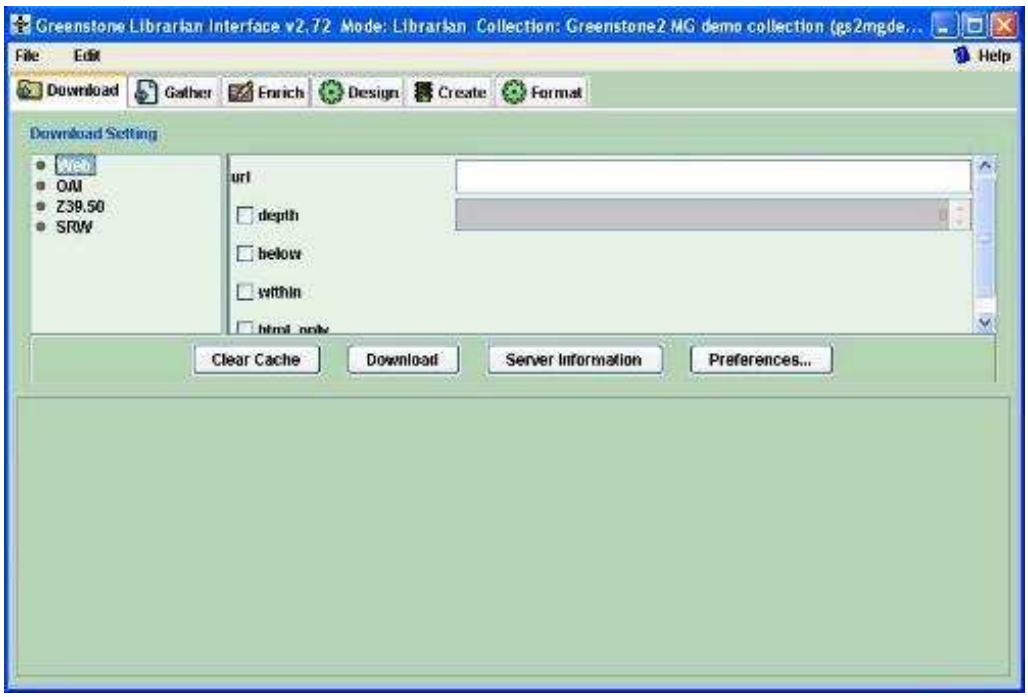


Figure 4.5: Current Greenstone download pane

Chapter 5

Usability Analysis of the current GLI

5.1 Introduction

As we have a generation of people (senior users) who have a great deal of information that would be ideal to store in a digital library, it is only sensible to make sure that the GLI is usable for them first. This study was designed as an explorative study with the intention of discovering what troubles senior users have with the current GLI (Greenstone Librarian Interface). An explorative study is a less formal usability study than normal. The aim of the sessions is to find out the users opinion and issues in the interface in an unobtrusive manner so as to keep the participant relaxed.

5.2 Aim of the study

The aim of this study is to highlight the areas of the Greenstone Librarian Interface (GLI) which need redesigning so that the interface may become more useful for the Senior user group. From this study I aimed to ascertain particular difficulties the participants had with parts of the interface. I would then consider these difficulties with the interface and decide what parts needed changing or removal and which parts of the interface were fine as they are.

5.3 Design of the study

The first thing that was decided when designing this study was to make it an explorative study. This was a good design for senior users as it made them feel like a solid piece of the re-design process. This was essential with senior users as previous

research has suggested that new and unusual situation can adversely affect seniors and their performance with technology. This would have been detrimental to the study.

In the first study, the participants were given a scenario and asked to complete some tasks with an aim of collecting samples of documents that might go in a collection. However they were not told the exact type of information that was wanted from their participation. This left the participants wondering if they performing the task to my satisfaction and in a few cases left them confused as to the aim of the study. In retrospect this was not a good idea. The study that is discussed in this chapter was designed to keep the participants fully informed about what is required of them at all times.

The study is split into three sessions. Each session is designed to take only an hour and a half, however the sessions can be further broken up and customised to each participant's needs, however no participants felt the need to break up a session. The participants were asked to follow a tutorial on using the Greenstone Librarian Interface. After the completion of each task in the study the participants were verbally asked a series of questions about the task and any problems, their answers were video recorded by the researcher. Finally the participants were asked to fill in a demographic questionnaire.

The participants were informed that at any time they could ask any questions they wished about the interface and at any point leave the study.

5.4 Tasks

When reviewing the sessions afterwards certain tasks were timed so that they could be compared by participants. These tasks, while not all the tasks in the sessions, were the tasks that involved the GLI. The first session consisted of four tasks that involved exploring a finished digital collection. These tasks were not timed as it is the GLI that is being re-designed; however some of these tasks results were used to infer design changes in the interface. These inferences are discussed further on in this chapter. The only task involving the GLI that was not timed was the addition of documents to the collection. The reason for this is that too many participants stopped in the middle of this task to ask the researcher questions which meant that

timing the task was be very difficult and inaccurate. Below is a list of the tasks that were timed. The first three tasks occurred in the second session of the study while the fourth to tenth tasks occurred in the third session. The build task occurred six times throughout the study, in both the second and third sessions. The first session of the study was dedicated to examining a built collection.

1: Open an existing collection

- Go to File then select Open
- In the new window select Introduction Collection
- Have a look at what has changed on the screen
- Then click on Open

2: Create a new collection

- Go to File then select New
- In the Collection Title box type 'My First Digital Collection
- In the Description of Content box type 'This is my first digital collection
- Press the OK button

3: Add a piece of Metadata

- Now click on the Enrich tab
- Click quotes.doc on the left hand side of the screen, if it isn't already highlighted.
- On the right hand side of the screen click on dc.title
- The box next to it is now has a cursor.
- Type Quotes by Winston Churchill

4: Create a new collection

- Go to File then select New
- In the Collection Title box type 'My Big Collection
- In the Description of Content box type 'This is a big collection
- Press the OK button

5: Add more Metadata

- Go to the Enrich tab

- Double click on Hillary so that you can see each file
- Click on hillary.htm and then click on dc.Title
- Type 'Images from Sir Edmund Hillarys life

6: Use Form Search

- Click on Form Search
- Type Sir Edmund into the first box
- Select dc.Title from the options list to the right of the box
- Press the Search button
- In the second box type 'hillary and select filenames from the options list
- Press the Search button again

7: Alter maxdocs using the arrows

- In the box to the right click the little arrow up so that the number is 5

8: Alter maxdocs using by typing the number

- In the box to the right type the number 10

9: Add a classifier (Phrase search)

- Click on the Design tab
- Click on Browsing Classifiers
- Click where it says Select Classifier to add
- In the options box next to this select Phind
- Then click the Add Classifier button
- The researcher will explain some of the options presented in this window.
- Press the OK Button

10: Use phrase searching

- Click on Phrase browse
- In the box type 'Mount Everest is in Nepal
- Click the Search button

11: Build the collection

- Click on the Create tab
- Click the Build Collection button
- Once the process is finished click OK on the box that pops up
- Now select Preview Collection

5.5 Hypothesised results

Throughout my study of the literature on interface design for seniors I have formed a series of ides as to what which aspects of the in GLI interface senior users will have the most trouble with. I have many years experience as a user of the Greenstone software, and over this time I have used almost all of its tools. This experience I feel leaves me with a good idea of what aspects of the interface will be difficult for seniors, and therefore where the major usability issues will arise. Here I will discuss these ideas in more detail.

The first and largest issue I had expected senior users to have with the current GLI was the terminology of the GLI. I knew from experience that some of the terminology can be hard to understand to conceptualize. For example, when I (a 23 year old user) started using Greenstone I had not come across the term metadata much before and when this term was used I became very confused. If I had trouble understanding this term the first time I encountered it, I felt that senior users would have an even more difficult time.

The existing research[11] had suggested that senior users had difficulty discriminating between colours in the blue and green ranges. This fact had surprised me, but also gave me the idea of creating RedRock (discussed later in the chapter). Before performing this study I created the RedRock colour scheme with red and brown colours so that it would be easier for seniors to discriminate the colours and objects in the GLI. I felt that this would be a significant change to the interface and would make the software much more usable for senior users. I expect the results of this study to back up the previous research and suggest that the green and blue colours of Greenstone are unsuitable for senior users.

The next hypothesis I had for this usability study was that the participants would say that they interface is too cluttered and needs to be more spread out. The GLI contains a lot of options and features, and these features can take up a great deal

of space sometimes. My expectation was that the current spacing of components in Greenstone is not usable for senior users, and that it will have to be increased.
The final hypothesized design change I had for the GLI was that some options would need to be the removed. I had decided to design the senior interface as a mixture between two existing interfaces, the Assistant mode and the expert Librarian mode, I theorized that there would be some features that would be too complex and would need to be removed. My expectation with this study was that the participants would have trouble with one such feature, adding a classifier. This is a complex process and I think it may be too difficult for senior users to complete and may need removal or simplification.
As the tasks are timed and analyzed later for trends, I hypothesize that the time it takes a participant to perform a particular task decreases over time. This follows the idea that as the participant learns how to use the interface and perform the task then they become quicker at the task.
These hypotheses discussed above are what I expected the participants of this study will have difficultly in using.

5.6 Participant One

This participant said that having some way of classifying sections by milestone and time would be useful for browsing. This would help people see events or objects in context. They felt that none of the options they had encountered so far in the session were bad, but that they all needed a good explanation. They all had their uses but that was not immediately obvious when presented with them. This participant had a preference for intuitive wording. They felt that the wording in the interface, both in the collection view and in the GLI were complex and hard to understand. They suggested a good manual or glossary. Another aspect that they disliked, and this is demonstrated in the text search in collection view is that if the text boxes are not aligned correctly the interface looks half-baked. They felt it did not have a finished look and be distracting having to navigate not only vertically but horizontally to get to the next item.
They also mentioned that the boxes were awfully close to each other. Later in the form search this problem of close boxes is shown to be a big problem when the

browser tries to auto-complete what the participant is typing. They type the exact same word that is in the auto-complete box but the auto-complete box does not disappear and the participant then has trouble accessing the next text box below as the auto-complete box is obscuring it. This participant also had some difficulty with the + and - handles on the tree structures in the GLI. They had not encountered these much in the past and was not sure how to use them. They found them to be confusing as they did not know whether to use the handles or not. This made them confused and they felt an explanation of the handles and how to use them would be useful.

When adding documents to the collection the participant agreed that having an option of drag and drop, and a button to add the documents, would be a good option as it allowed people who were not familiar with drag and drop to easily add documents to the collection. The participant had trouble locating the tabs; they were not sure what was selected and where to look for the tabs. They suggested a mouse over of the tab would give a brief description and help the participant find the correct tab. In addition the participant thought that the term metadata should be replaced by a plain English alternative. This is a common problem that has been mentioned by most participants. This participant, similarly to other participants, none tried to type the metadata value in the 'Existing Values' (see section 6.4) box. No participants thought this was a useful place for the box and just felt it was confusing. This participant in particular suggested it be removed. When building the collection this participant found the build info to not be useful and just an annoying feature. For this reason they though it should be removed. This participant went on to re-iterate how important they thought it was to have a detailed tutorial on how to perform the tasks. They felt this was essential to users being able to know what and how to use the software. This participant said they had no trouble using the interface to limit the number of documents in a build, however I did see them hesitate when looking for the particular arrow buttons which let them alter the current maxdocs number. I feel this may be related to that fact that there are two sets of arrow buttons right next to each other. The second set of arrow buttons is to navigate through the list of other options for building.

This participant continually found the language or the terminology in Greenstone to be a problem. They mention that the classifiers need to be in plain English otherwise

you may not know what they do. Overall this participant felt the system was good and very usable for them. They could think of many uses for Greenstone, especially in their genealogy work. However they had obvious issues with terminology in Greenstone, spacings and certain tools. They felt most of these problems could be solved with good explanation but they felt strongly that extra, non-necessary information should be removed as it was distraction.

Participant One has one of the most interesting results shown in the trend of their build times (See the Results section of this chapter for a description of the build task). They had a marked decrease of 3 seconds over the six builds. These results are reassuring as during the study sessions the participant had shown some nervousness and I had been worried this would affect their results. However, the results do show that participant learnt how to perform the build task quickly and retain the knowledge of that process. Their overall task completion times did show that they were slightly slower than most participants on three tasks (Tasks two, six and nine as shown in Figure 4.9) however these were only slight discrepancies and can ignored as the overall trend shows their times being average.

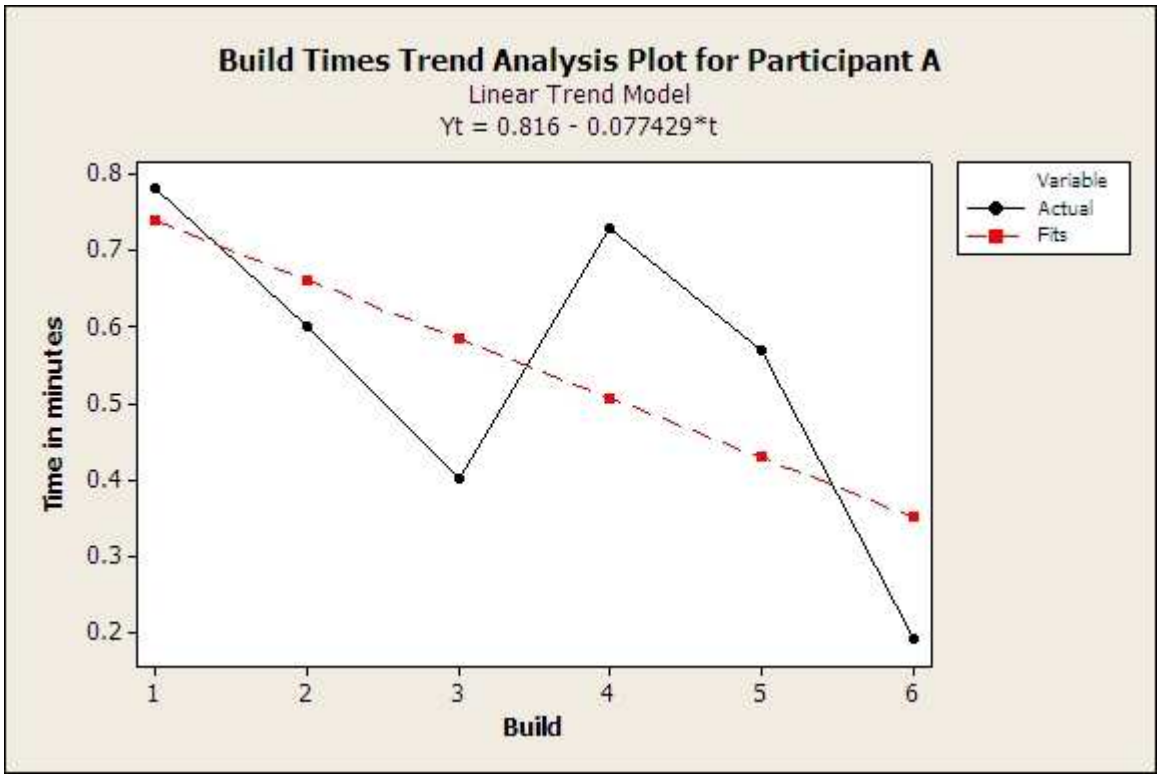


Figure 5.1: Build times trend analysis of Participant One

5.7 Participant Two

One thing to note about this participant was that they had used Greenstone produced collections before and had briefly looked at the software, however they had not used it yet.

This participant liked the browsing methods and searching versatility that Greenstone provided but they had felt it could be improved. In particular they mentioned how they would like to limit the amount of scrolling up and down pages that is required and would instead prefer a paged view, navigating from one page to another like a book. When searching they mentioned that the search does not work like Google's and it is hard for them to get out of their Googling habits. They felt it would be good if it was mentioned on the search page, how to search using a method such as a tutorial or introduction. Their initial thoughts were that the search options were useful however you would have to adapt to using them and become accustomed tot hem to fully understand them. They had no trouble with how the page was set out, and when a more aligned version was suggested they said they had no preference between the two. Their experience with creating a new collection provided no problems, however they felt a good tutorial for creating a collection would be useful for a first time user.

When asked if they had a preference between using drag and drop to add documents to a collection or to use a button the participant said they would like both methods. They felt that it was good for people who were not comfortable with drag and drop. When discussing if the participant could see if a particular item was selected they thought the current method was acceptable, however they did feel that a blue highlight on a light blue background was a bit hard to see and that maybe a green highlight on the blue background was more appropriate. This participant had no trouble locating particular tabs and did not hesitate at all. The participant did have some suggestion regarding metadata and rebuilding. They suggested an alternative name for metadata as 'file details'. They felt this more of plain English alternative that was easier to understand. While the participant did not have trouble with the process of rebuilding a collection they felt that the term rebuilding might be a bit daunting and sounded traumatic and instead suggested calling it updating. They felt this was a more comfortable term that represented the process better.

A pet peeve that this participant had with Greenstone involved opening the applications. In particular they disliked how the names of the librarian interface and the library were similar. This led the participant to open the wrong one on a few occasions. They also disliked how many dos windows appeared and they would have preferred the windows be invisible or at least minimised from the start of the application. This participant in particular like having instructions and was one of the participants to suggest a thorough guide or tutorial be written for users to follow. However I found that this participant had trouble following the instructions as in some places they rushed through the session description looking for only bolded text that would describe an action. This meant that they missed a few descriptions, and in one case where one instruction was not bolded by accident, they missed an action. They did feel that a lot of the tasks required in Greenstone were not intuitive and that this required a tutorial and guided help.

The participant felt that the process of turning on maxdocs was not too difficult and their only complaint was that the arrows were too close to another set of arrows. However in observing them I discovered that they mixed up their left and rights easily and seemed confused by how the number was right aligned on the page. It seemed that if the number was more centred in the screen then they would not have as much trouble. They also had trouble seeing which pane was currently selected. They had some obvious difficulty distinguishing this. As with most of the participants this participant found the classifier names to be quite confusing, such as AZCompactList and Phind. They felt that a plain language alternative would be better, such as A to Z list and phrase searching. However they felt having such a tool as phrase searching was useful, they mentioned that Google was a searching benchmark, but with Greenstone having features such as frequency of search term in a document and number of documents containing the search term readily available they felt Greenstone had surpassed Google.

Participant Two showed an unusual result in their plotted trend of build times: their build times increased over the six builds. Only one other participant showed a similar trend (Participant Eight). As the predicted outcome was a decrease in time it is not hard to understand how this increase in the build time could in fact become a decrease if the participant had had more practice and building so as to remember better how to perform the task and learn where objects were located. This predicted

decrease in time given further practice is supported by the fact that the rest of the tasks that this participant performed were within acceptable ranges of the rest of the participants. The only task which would suggest otherwise is task nine, and this time is only slightly off the norm shown in Figure 4.9.

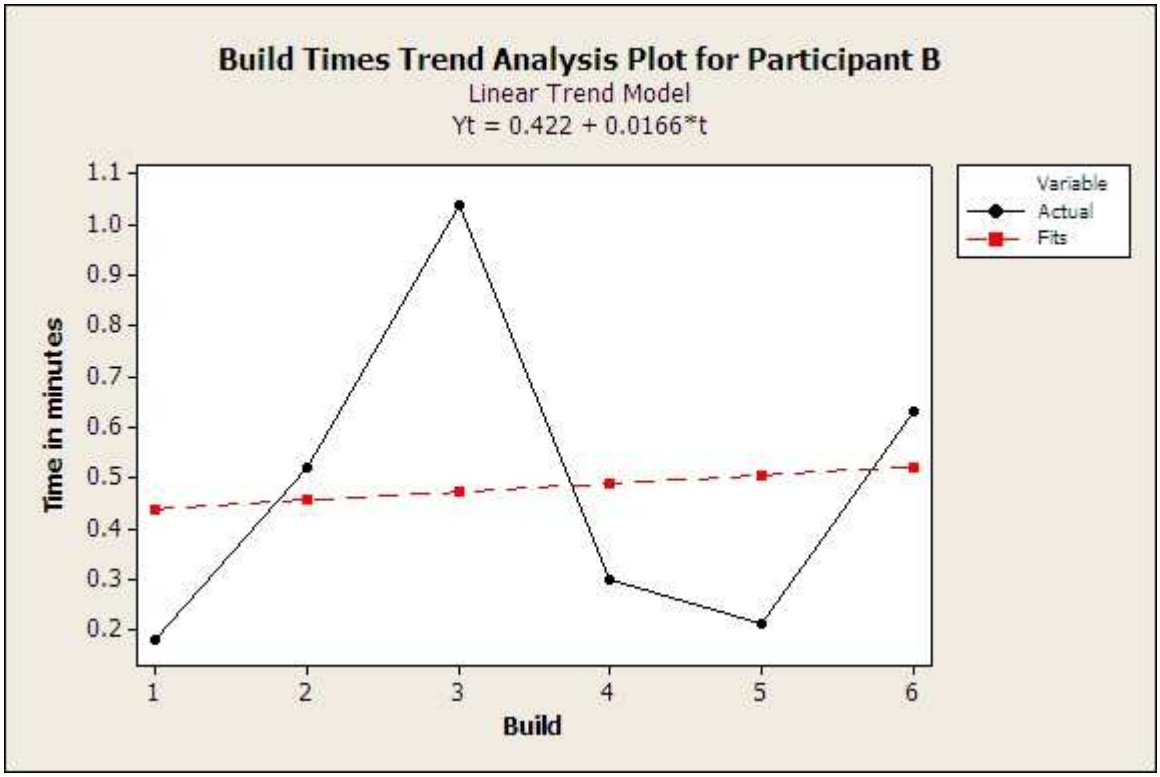


Figure 5.2: Build times trend analysis of Participant Two

5.8 Participant Three

This participant was very cautious and precise throughout the study. They seemed to not want to make any mistakes. Once the participant started the study they started opening up about what they felt was bad about the interface. The participant said that it confused them when they were presented with a complex and unnecessary amount of information. This echoes observations mentioned in Hawthorn [11]. They mentioned this overuse of options in a few places within the study, one area being the search forms. They felt that the stemming and casefolding would be rarely used terms and therefore should be omitted. In addition they emphasized how unnecessary they though complex terminology was. And example in the search

forms of this is terms such as stemming, where you need a definition of the word to understand the function of the option.

This participant also had a dislike for the + and - symbols. Before the session they did not know how to use the symbols and once their use was explained to them the participant felt that they were unnecessary as there was a commonly used alternative (double clicking the folder).

This participant also felt that the buttons to add and remove an item from the collection was a good alternative to the drag and drop method in case the user did not know this method. They also felt clear instructions were needed as this participant was unsure of what to do with the file without the step by step instructions provided for the session. They also felt that highlighting of items could be enhanced by the use of a different colour, such as grey.

This participant sped through the instructions and in the process skipped a few instructions and ended up in a confused and lost state. The session itself did not seem to be rushed, however they seemed to want to complete the tasks quickly and correctly which suggested to me that they were viewing the session as a test. For this reason I started orally reading the participant the questions so that they did not have to keep looking at the written instructions and then move their sight back to the screen.

This participant also had trouble understanding when to use a single left mouse button click and when to use a double left mouse button click and what the consequences of each action were. They suggested a guide to where to click and when.

Overall this participant had trouble with the wording of the interface and suggested changes for some of the problem items. They also had difficulty with the fact that the librarian interface and the library were not linked, so that to open the librarian interface they first had to open the library, and numerous times they clicked on the library instead of the librarian interface and vice versa.

Participant Three shows a significant decrease in their build times throughout the three sessions. In fact their build times mirror those of another participant, participant Four. The noticeable difference between these two participants is that participant Three took about a quarter of a second longer than participant Four on the tasks. Participant Three's times for the rest of the tasks (Figure 4.9) was what would class as average as their task time rarely differ from the main results.

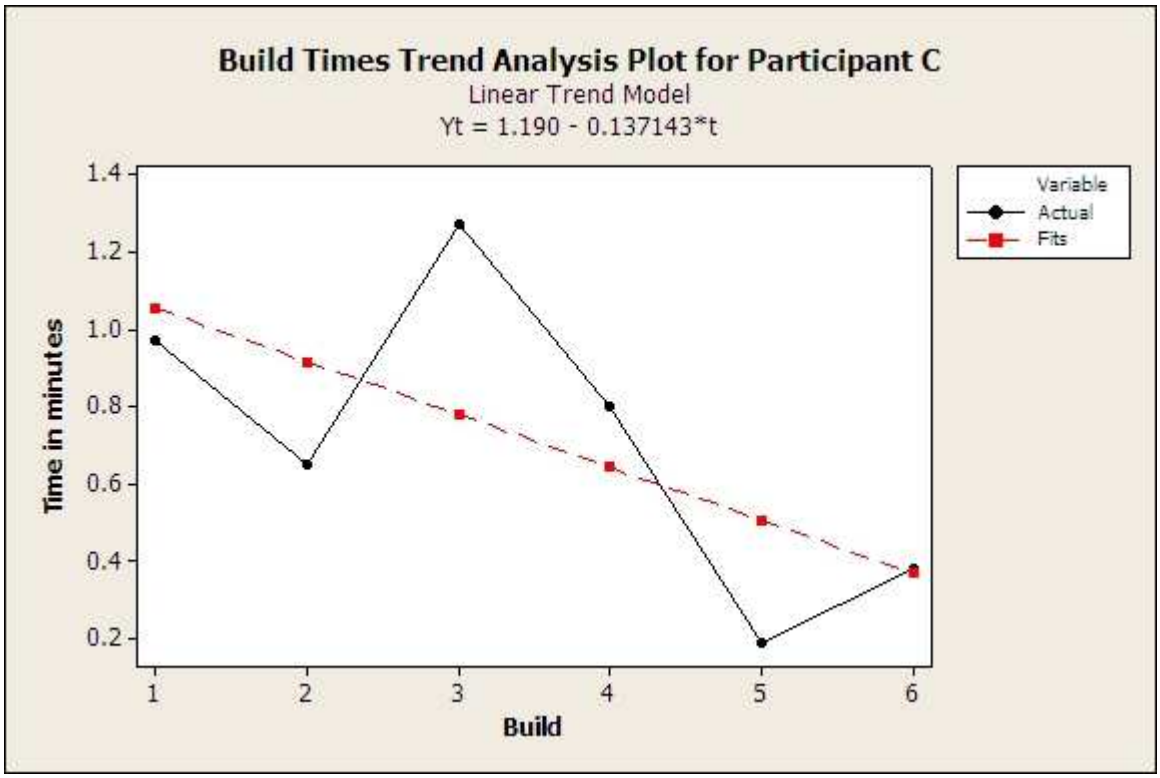


Figure 5.3: Build times trend analysis of Participant Three

5.9 Participant Four

This participant preferred to arrange documents in a chronology marked by memories and associations. For example year, time and location can be used as associations for a document.

They felt they would have no particular need for accentfolding, a search option which removes accents such as $\hat{a}$ so that they turn into a non-accented equivalent such as that is then used for searching. They then suggested some scenarios in which stemming would be a disadvantage, such as when you are looking for a name, stemming might stem a surname such as Builder and give you less accurate results than you intend.

This participant also felt that the order of the options on the searches was strange. They felt the index should have been the first option and suggested removing ones like accentfolding which would be seldom used.

This participant easily got lost when two objects had similar labels. A good ex-

ample of this is when the participants open up the library and then the librarian interface. The similar naming of these two options led the participant to open the library twice and then to correct the problem they went to close the second library but accidentally closed the GLI.

In addition this participant had some trouble discerning which items were currently selected and suggested that the highlighting have a darker blue colour instead of a light blue. A good example of this is when the participant kept selecting a file that was already selected, but they could not see clearly that it was selected. They clicked on the item a few times, in the end opening the file and getting confused as to what had happened. This participant did like the ability to open a file and look at it while entering metadata or adding the document to the collection as it gave them an idea of what they were describing, however they felt it was confusing when you opened a document by accident.

Like all of the participants, this participant had particular frustration with the dos windows that run in the background. The dos windows superimposed over the windows Four was using (GLI and library) and confused the participant. The participant suggested hiding these windows so that they were not so distracting.

The participant also had trouble navigating back to the GLI from the collection view, most of this trouble arose from the dos windows having similar naming to GLI.

This participant did suggest that most of the troubles associated with the software could be overcome by familiarity but they seemed disinclined to use the software beyond this study, and said they would only use it when they wanted to create a specific collection, and therefore familiarity with the software would be hard to come by as they would not use it regularly.

Participant Four also had trouble with the existing values window in the enrich tab which allows the participant to assign a previously used value with a single click. While they were not the only participant to have this trouble, this participant had specific trouble as they kept trying to type in the window. This was contradictory to their earlier movements within the interface that suggested that they were a precise and cautious participant. In the enrich pane they read the instructions once or twice and then tried to complete the task using intuitive navigation, which got the confused and lost. For this participant in particular, the interface was not logical,

and this occurred with participants.

This participant also came up with a helpful suggestion regarding the maxdocs option. Once they had completed the maxdocs task I had to remind them that maxdocs was on and therefore they would still have only 10 documents in their collection the participant suggested a reminder appear saying that maxdcos is still on, and do you want to proceed. These kinds of reminders are essential with senior users as they cannot always remember clearly what options they have turned on.

This participant had the view that the more search methods available, the better. They particularly liked the phrase searching feature and suggested only two ways in which it could be improved. The first was to have a more simplified process of adding the classifier in the GLI, they saw no reason to change the default settings and suggested that these unnecessary options be removed. The second suggestion was for the phrase searching to have highlighting of the search terms, in this case a phrase, like the text and form searches.

Participant Four has an unusual result in their build times as they show a very distinctive decrease in time over the course of the six builds. This surprised me as I expected most of the participants to have only slightly decreased trends. However this participants results show me that they mastered the build task effectively and quickly and I would class them as an expert at the build task. This trend is echoed in their times for all the other tasks (Figure 4.9) where there times are uniform with most of the other participants.

5.10 Participant Five

This participant easily identified with the intention of this thesis. They had previously attempted to create a "talking book" (an audio recording) of their research and family history for future generations so that their knowledge and experience could live on. They had a good appreciation of all the search and browse features but did suggest a chronological view so it would be easy to associate all the events and time periods to each other.

They thought that searching would be an extremely useful tool on such a collection but they did take exception to a couple of the search options. They felt that accent-

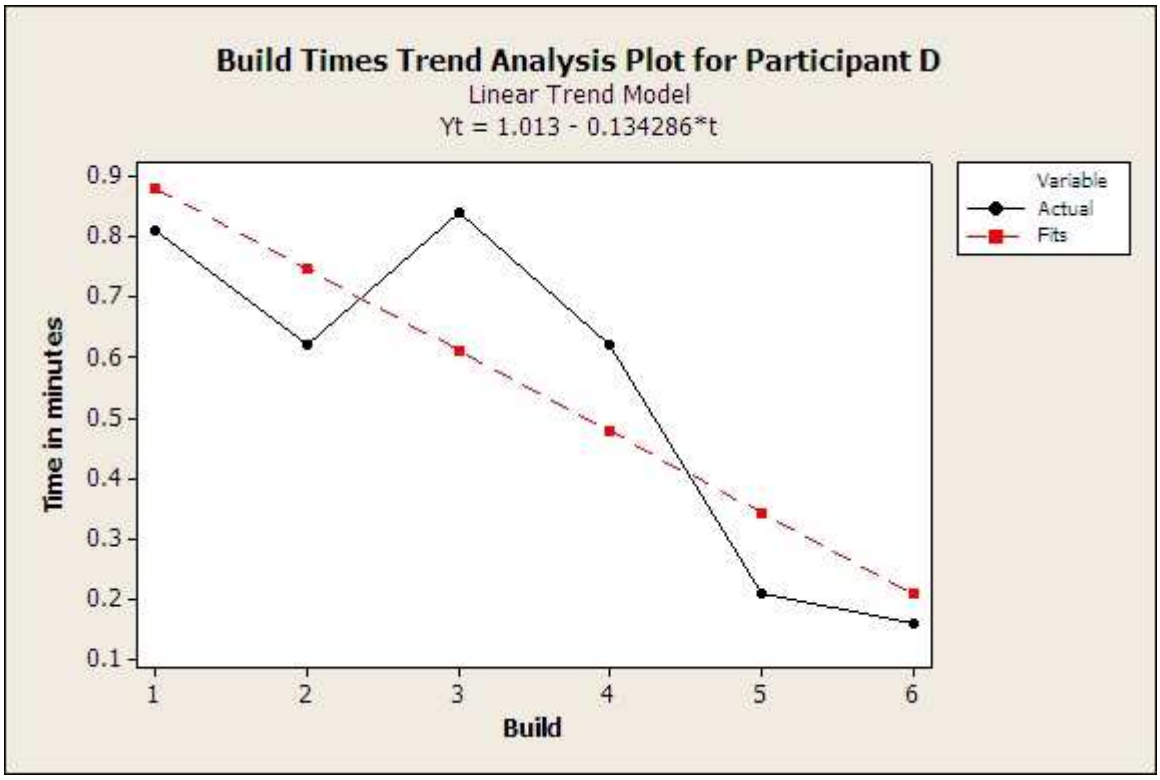


Figure 5.4: Build times trend analysis of Participant Four

folding is so rare it is highly unlikely to be used. They felt the same for ranking as they saw no reason why they would want to change the order in which the results were shown. They did not have a dislike of a particular aspect of the layout of the form search page, but they did feel that it was not right and looked unfinished.

Participant Four also had some trouble differentiating between the Greenstone library and the GLI. They clicked on the library icon a second time while trying to open the GLI. It took them a minute to realise their mistake and in the end I had to close the second library as the participant was lost and confused.

This participant also had some difficulty in using the + and - symbols. Like other participants they seemed unsure of whether to single click or double click on them.

Like some other participants in this study this participant agreed that having both a drag and drop option and an add to collection button were useful for different situations, and especially good for those who do not know how to use drag and drop.

Overall this participant had minimal difficulty, however they did have some eyesight trouble (short and long sightedness) and this lead to some slightly slow times in performing some tasks. However background and highlighting colours were not

affected by this sight deficiency, and the participant found it easy to see what was highlighted. However they did mention that a blue highlighting box on a light blue background was probably not a good idea.

Participant Five showed only a slight downwards trend in their build times. This suggests that they did in fact learn the task of building a collection throughout the course of the three sessions. However, this declining of build time trend had only a small gradient which suggests that they would need longer to perfect the build task and significantly decrease their build time. The rest of their task times (Figure 4.9) show that their times were very close to the times of the other participants. The only task which suggests a slow completion time was task six which is in fact the longest task out of all eleven tasks.

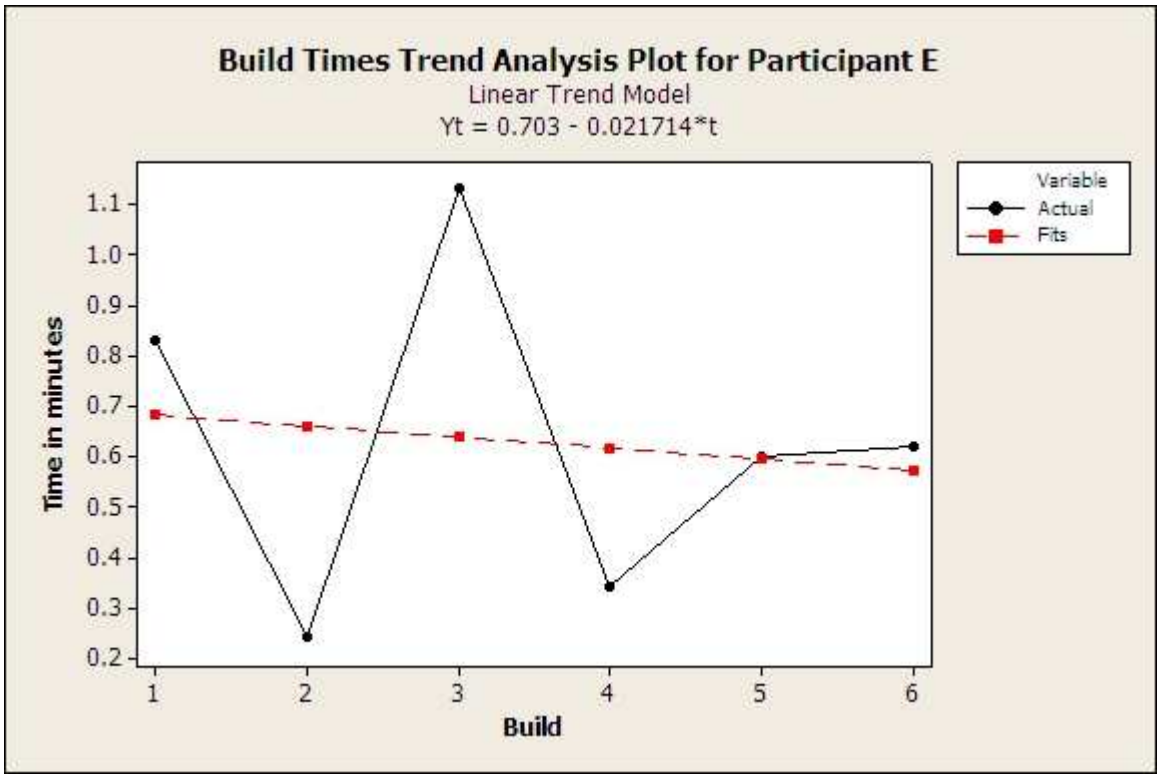


Figure 5.5: Build times trend analysis of Participant Five

5.11 Participant Six

This participant is what I would class as a more experienced participant as they have spent a number of years working with computers and appeared confident throughout

the sessions. Throughout the sessions they had few problems or questions. Overall I found that they had some difficulty with some new concepts, which is expected, and like many other participants they explained that having a good explanation, such as a help file can help them understand new concepts easily. The most difficult concept that this participant had trouble with was the idea of metadata, however they said that the example given of the location of a book in a small library was sufficient enough to explain the idea.

They were a very confident participant who read the instructions carefully before attempting the task, and made very few mistakes with the interface. In particular this participant found some aspects of the interface, that others found difficult, to be easy. An example of this is the + and - symbols on the collection and workspace trees. This participant had used these before and found them to be very useful, whereas other participants had seen them before but did not know how to use them. This participant was very quick to adapt to changes in the interface. For example, in the add metadata task in session three, the participant is instructed to 'Go to the Enrich tab and Double click on Hillary so that you can see each file' however, if the participant had opened the folder Hillary in the Gather pane (as many participants had done to explore the files), then it stayed open in the Enrich pane. This anomaly in the state of the interface confused many other participants, but not this participant.

While the participant understood the concept of metadata after some explanation, they found the process of adding metadata a little difficult, and like some other participants they were confused by the existing values box and seemed to want to type their metadata value there. However they did complete the metadata tasks completely and went on to suggest that they would find the process easier with practice.

When this participant reached the task regarding maxdocs, they were quite excited. They seemed to have thought about the issue of build times and large collections already, and this option answered their questions. However when they tried to adjust the maxdocs value they said that they found the numbers to be too hard up on the right and the arrows to be a little bit small. This observation confirmed my suspicion that the arrows may have been too close to the scrolling arrows for the pane and that this might cause confusion as to which arrows to use. Overall this

participant seemed to find the current Greenstone interface fairly easy to use, and most issues could be dealt with by providing good explanations, which Greenstone already does with the help feature.

Participant Six's graphed build times and the subsequent trend show a definite decline in time. This decline showed that the participant managed to remember the steps of the build task or the position of buttons, and therefore decrease their build times of the period of the three sessions. This is a good result as it shows they are quick at learning and retaining knowledge. This trend is not shown as clearly when their overall task times are taken into account (Figure 4.9), however it must be kept in mind that each task took a different amount of time to complete and therefore some task times cannot be compared effectively. This participant's overall task times did keep within a reasonable range of the rest of the participants task times. The only anomaly was their task five time which was slightly out of range.

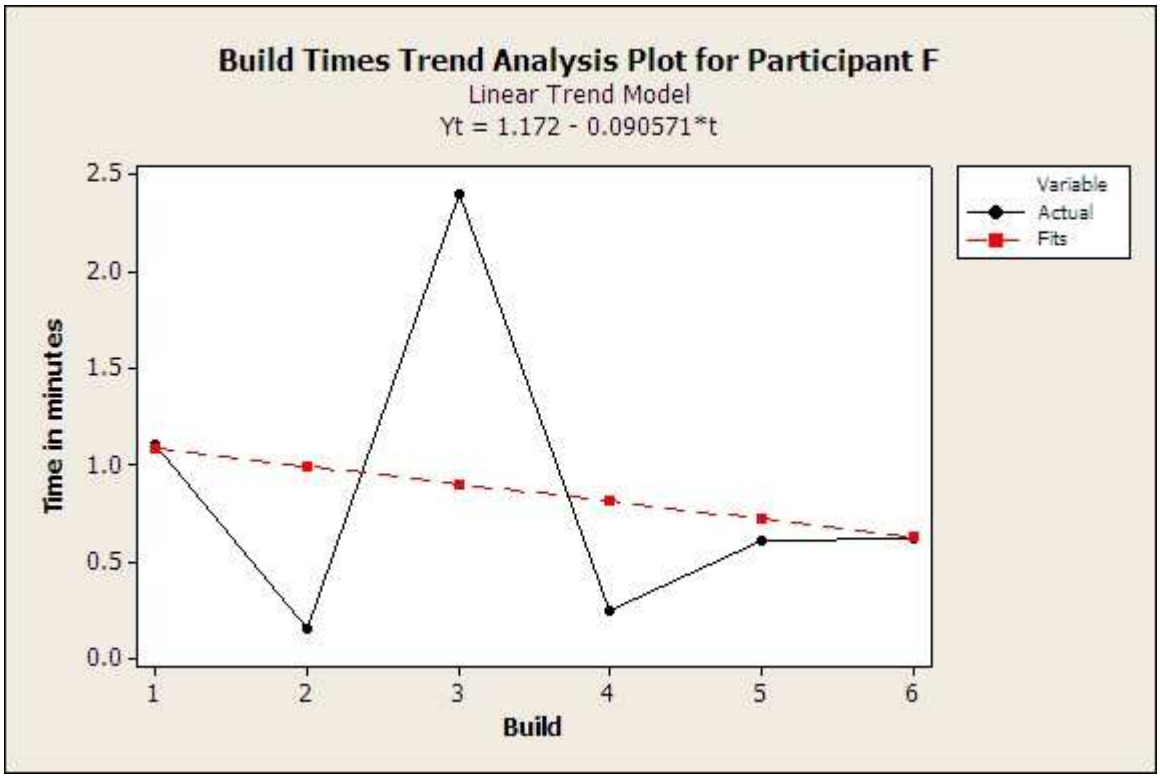


Figure 5.6: Build times trend analysis of Participant Six

5.12 Participant Seven

Participant Seven had some very helpful suggestions about the GLI interface and provided some good insight into difficult areas of the interface. Like most of the participants in this study they had difficulty understanding the terminology and concepts that were presented with Greenstone. These issues included casefolding, stemming, metadata and classifiers and maxdocs and the idea of the workspace tree. The workspace tree was probably the most difficult concept to explain to this participant as they were used to browsing their file systems in a non-tree structure form. In the end I had to use a metaphor of that the workspace tree was a window into the file structure of their computer. While this participant had trouble with this concept, I did not find any other participants that had similar trouble. The second most difficult concept that this participant dealt with was to do with metadata. The idea of metadata was not too confusing to them once they had read the explanation in the session instructions, however they instead had trouble with the difference between a file's title and a file's filename. Their assumption was that a title and filename are in fact the same thing, and they had seldom had cause to think otherwise. In the end I decided to show them an example, demonstrating the difference, using a collection on the New Zealand Digital Library website (www.nzdl.org). While showing them an example of how a file can have a separate title and filename, I finally saw the realisation click and the participant became much more at ease.

They also found the auto-complete in the search forms to be annoying as they could no longer type in the box which the auto-complete covered. This is an issue that has come up among other participants, and most of the time the problem is due to the fact that the auto-complete box appears over the top of another option. Making sure of good spacing so that auto-complete boxes can be accommodated is a good way of accommodating this issue.

This participant, like many of the others, said that they had no trouble observing which documents were currently selected, but also like many of the other participants, they suggested that a highlighting colour of blue was not a good idea and another colour should be used. Their reasoning for disliking this colour was that the background was a similar shade of the colour and that to some people it may be confusing or hard to see the selected document.

Again like many of the other participants, participant Seven had some trouble with rebuilding the collection but suggested that with time and practice, this process would become easier, and no doubt quicker. In addition they suggested that the terms rebuilding and build were not suitable as they suggested an extensive remake of the collection, which from the participants point of view was not what happened. After this session I theorized that this participants misunderstanding of the terms rebuilding and build may stem from the fact that they do not see the building process, except via the build output in the create pane, which very few participants took the effort to read. From the participants point of view they are not building but more updating the collection.

This participant had particular trouble when it came to similarly named objects. In particular they had trouble when trying to open the Greenstone Library and the Greenstone Librarian Interface as they are similarly named. This problem has crept up with other participants in this study, but this participant took a particular dislike to the naming and started to become agitated. In the end I had to give the participant a few minutes break to let them calm down, and instead we talked about their hobbies. This break helped the participant feel more at ease and they happily carried on with the session.

This participant had an interesting comment regarding the colours of the interface. They said that they liked the greens and blues, and preferred them to "'those garish reds and browns"'. This was useful information as previous works in the areas of seniors and interface had suggested that greens and blues were actually harder for seniors to see. In fact no participants in this study had any trouble with the greens and blues, excepting trouble with the blue highlighting of documents.

Participant Seven's build time trend shows a very slight decrease in time (Figure4.7) of the period of the six builds. This is what I expected from all the participants. Because participant Seven's trend is minimal it leads me to believe that in the space of the three sessions they have only just started to show their learning ability. This impacts how quickly they can learn to use and interface, and in fact reinforces my earlier suspicion that as the participant found it hard to understand new concepts, they would also take a long time learning to use a new interface.

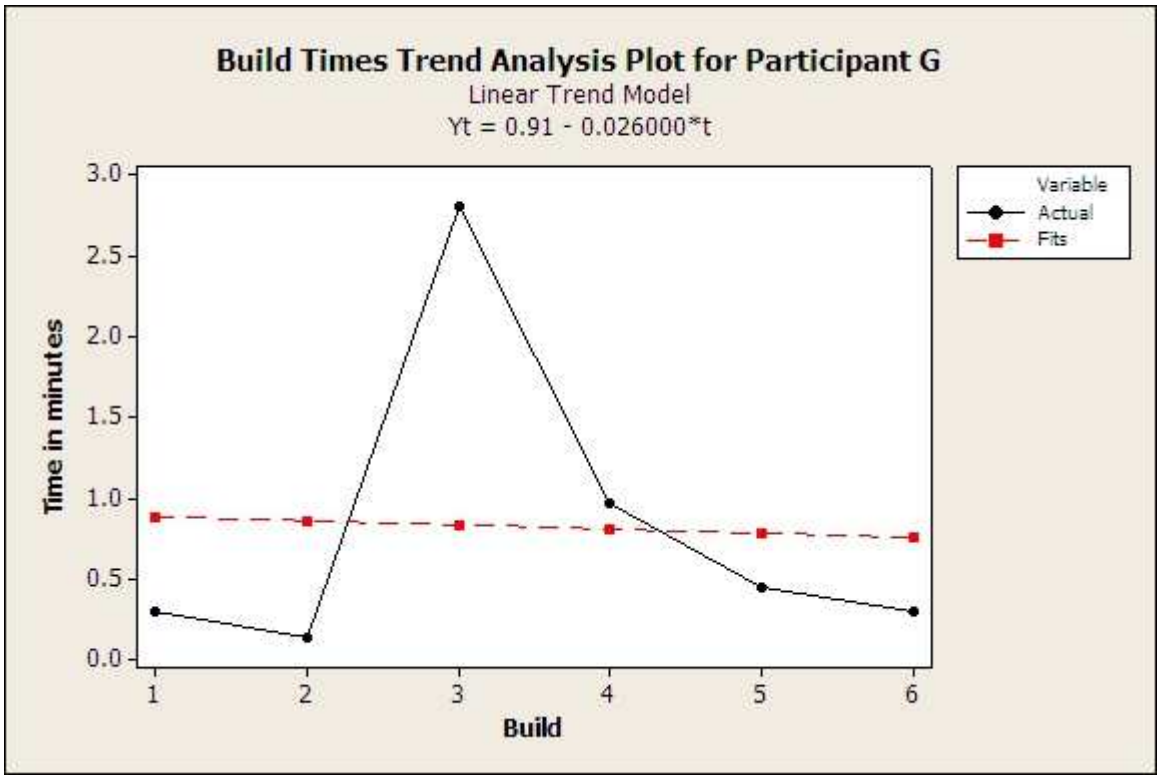


Figure 5.7: Build times trend analysis of Participant Seven

5.13 Participant Eight

Participant Eight had an immediate dislike for the terminology used in Greenstone. They had numerous suggestions on what terminology to change. They were quite forceful in their suggestion that the terms have to be rewritten so they are easier to understand or there needs to be a glossary of some sort where a user can check what a term means. This participant, while having come across the auto-complete feature before, has not had much experience using it. They said that they should use it more often as it was a useful feature.

This participant had also encountered the + and - symbols before on a tree, but they have never really used them. When asked if they preferred the drag and drop method of adding files to the collection this participant said that they preferred it to using a button as using an 'Add to Collection' button required extra movements. This participant had the most obvious trouble with the highlighting of documents. When a document was highlighted they did not recognize that it was highlighted. This is the only participant that actually had trouble being able to discriminate colours in the interface, however the trouble only seemed to occur when the highlighting colour and the background colour were the same, just different shades. In

this case it was in the workspace tree. This demonstrates that they can differentiate between blue and green but not shades of one colour, such as blue. At the end of the study this participant mentioned that they preferred pastel colours such as those used in the current Greenstone interface, and avoided the vivid bright colours.
This participant had a helpful suggestion about the process of opening up the Greenstone Library that can apply in more areas. They said that they felt a "'two step process was bad". This participant did not seem to have any particular difficulty in the first session but they did mention that clear explanations always help them and would be useful in the case of complex tasks such as form search and adding metadata.
This participant had some trouble when adjusting the maxdocs number. Instead of clicking the check box, their mouse cam a bit short and instead click the word maxdocs, fortunately this is registered as a click on the check box and the box was checked. However the participant did mention that trying to adjust the maxdocs using the arrows would be a difficult task for without their glasses, and that maybe the arrows should bigger and further in on the page.
Participant Eight's build times were on of only two trends that showed an increase in task time (Figure 4.8). This means that over the course of six build tasks their build time actually increased. This may have been due to many things, but does indicate that the time provided, three sessions, was not enough to shown this participants rate or learning. Compared to the rest of the participants, this participant was one of the slower performing participants, as is shown in Figure 4.9, they were constantly one of the slower participants.

5.14 Results

When studying the sessions on DVD I recorded the time it took the participants to complete certain tasks. Some of these tasks are repeated. In particular I timed the process of building the collection six times for each participant. The reason for timing this task multiple times was that it is the most common task and it requires the participant to navigate across the page to the build button, wait for the build to complete and then navigate their way to the preview button. The build and

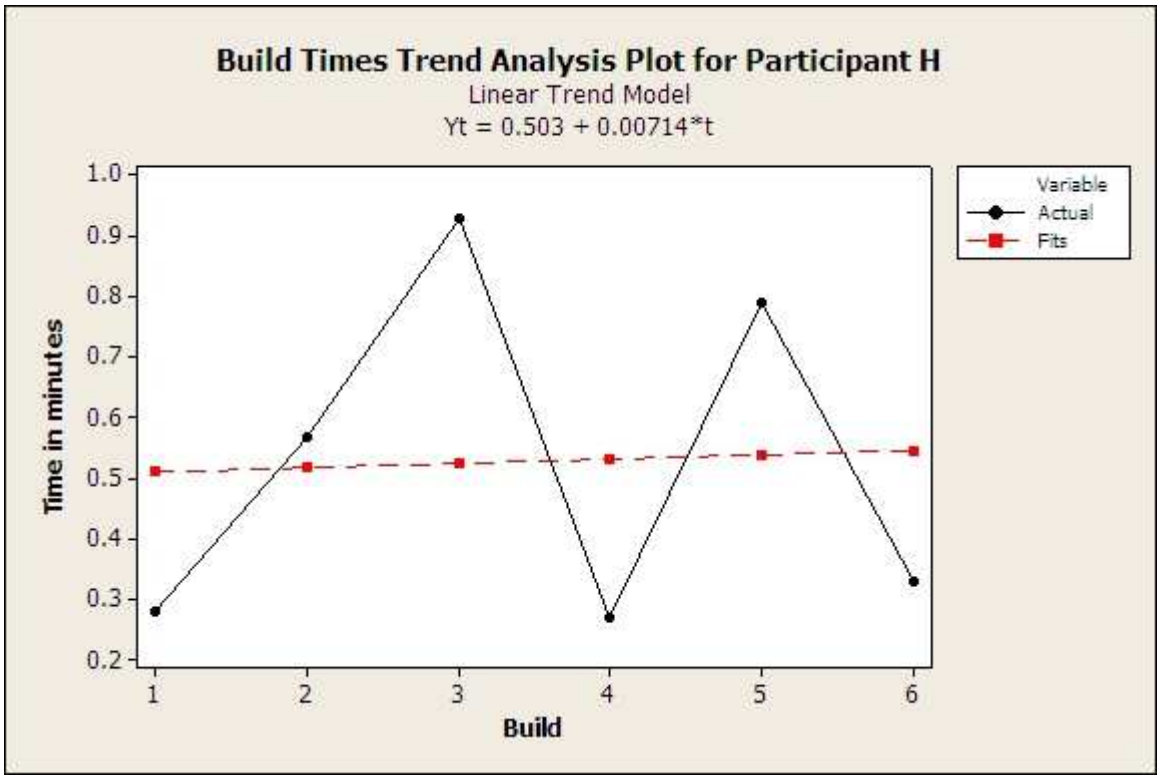


Figure 5.8: Build times trend analysis of Participant Eight

preview buttons are located almost next to each other, but once the build process is finished a pop-up window appears which requires the participant to navigate to the OK button on the pop-up window and then navigate back to the preview button. While the build process time is relative to the number of documents in the collection, whether maxdocs is on or not and the classifiers that are included, care was taken to ensure that for each participant the builds were timed in the correct order. This ensures that each build for each participant has the same number of documents and classifiers and the time that it takes the computer to perform its part of the build process is the same for each participant. As each participant followed the session outline it just required the participants to complete the builds in the correct process, which was done by all participants. So long as the times are kept relative to all the participants then there should not be any unusual results.

One thing that was noticed from the statistical analysis of the results was regarding the hypothesis that the participants would have a visible learning curve throughout the sessions. This means that the time to complete the build task will decrease over time. As mentioned before, these results are best viewed when compared to all the participants of the study.

Below is stated the null and alternative hypothesis.

$$H_0 : \mu_d iff = 0$$
$$H_a : \mu_d iff < 0$$
$$\mu_d iff = \mu_{lastbuildtime} - \mu_{firstbuildtime}$$

I ran a paired t-test over all of the participants initial build times and all of their final build times. The null hypothesis is that over the course of the six builds the participants time to complete the build task will stay the same. The alternative hypothesis is that the build time over the six builds will decrease, signalling the participants ability to learn a task over a series of repetitions. The hope was that the alternative hypothesis would be true and there would be a general decrease in the time it took the participants to build the collections. A decrease in time would indicate that the participants had learnt the task over the period of the study and had subsequently become faster at the task.
The paired t-test resulted in a p-value of 0.113 over a 95% confidence interval. This p-value means we do not have enough evidence to reject the null hypothesis, showing that there was not a general decrease in build times between the first build time and the last build time.

5.15 Demographic

The average age of the participants of this study was 74 years. There were seven men and one woman that took part in this study. The participants had a mixture of backgrounds ranging from Scientists to engineers and pathology. This is a good cross section of users. Some participants will have encountered computer in their work environment and may be more experienced than other users. None of the participants had any physical conditions that may affect their use of a computer, however every participant wore glasses or contact lenses.
When asked to rate their computer skills on a scale of 1 to 5, most participants rated themselves at 4. The average skill was 3.25 which suggests a confident group of participants. The average number of years that the participants had been using a

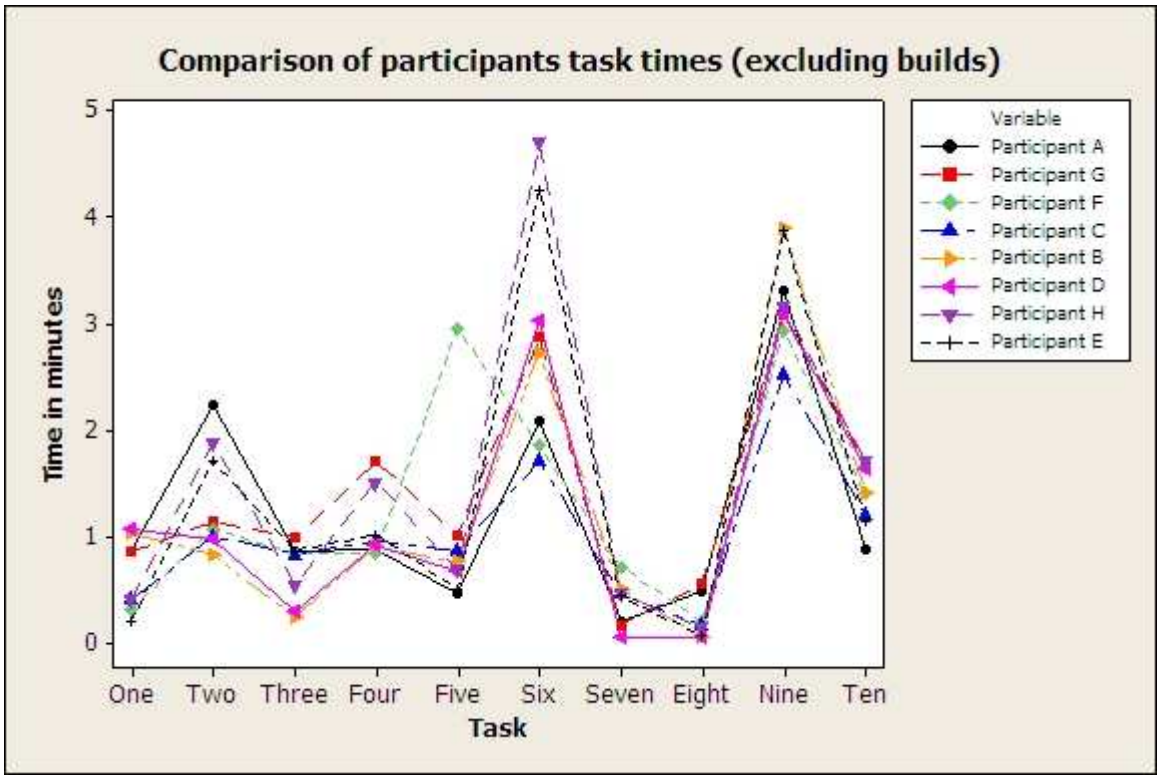


Figure 5.9: Comparison of participants task times (excluding builds)

computer was 23 years, and together they had a combined 184 years using computers. Overall these demographics show a broad cross-section of senior users who have moderate to expert computer skills.

5.16 Conclusion

The aim of this study was to discover what aspects of the current GLI senior users have difficulty using. The results of this study show that there are large areas of the current interface that are a problem for seniors users and will need re-designing. These issues help decide on the design changes that are to implemented. The most interesting usability issues that were found in this study was the use of complex wording or terminology and task complexity. The participants had similar problems with the wording in Greenstone being too complex. The general consensus was that without the session guides (appendix B) the participants would have felt lost and confused by the wording.

Task complexity also showed up as a big issues for senior users. When creating the study, some thought went into choosing tasks that represented different complexity

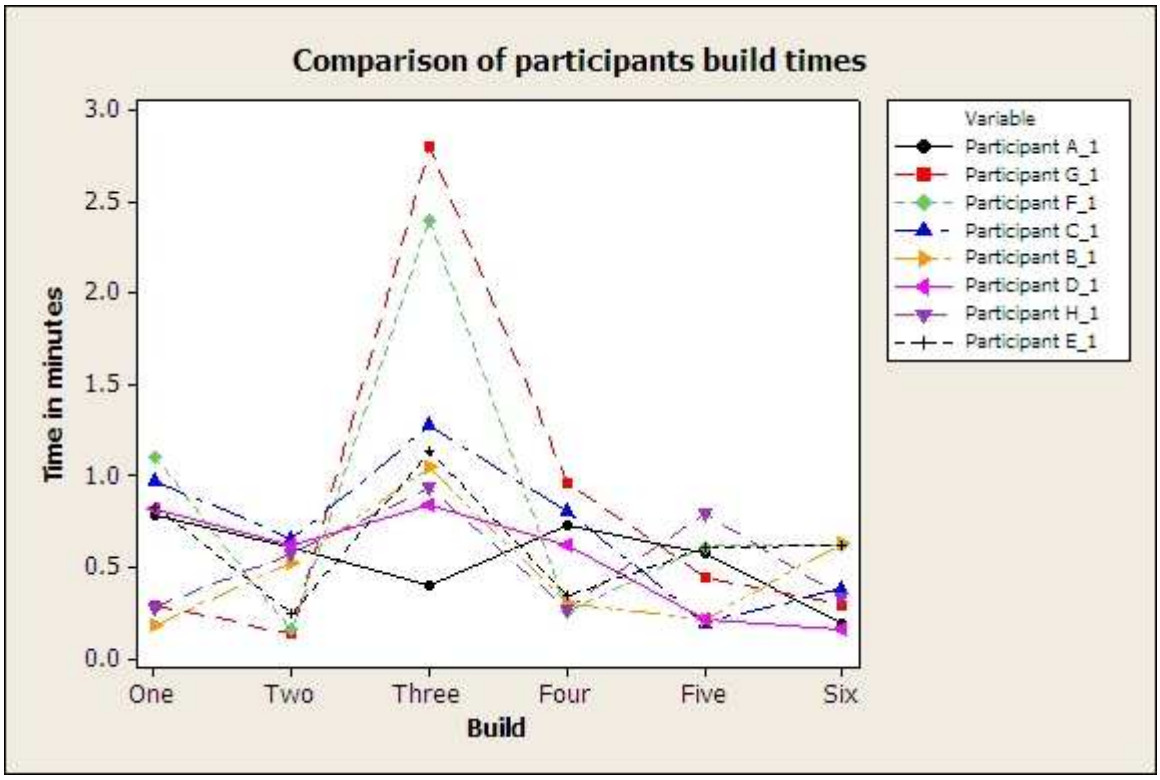


Figure 5.10: Comparison of participants build times

levels, this was so that an ideal level of complexity could be found for senior users. While the results of this study do show that most participants started having trouble at the adding classifier task, and only a little trouble with the adding metadata task, the results are still surprising as some of the issues raised within this task complexity surprised me. One such issue was one participant's lack of knowledge of when to use a single mouse click (for selecting) and when to us a double mouse click (for opening).

another interesting fact arose from my hypothesis that the time it takes a senior participant to complete a task, in this case the build collection task, would decrease the more they performed the task. This assumption was made from the idea that as a user learns how to perform a task they get faster and more accurate at it. While six out of the eight participants did have a decreased task time over the period of six tasks, two did not. This results was surprising and informative as it shows that some senior participants can take a long time to learn a new task and master it. This will impact upon task complexity as a more simplistic task will be easier to remember.

Overall this study has provided some good insights as to what features of the current

GLI need to be re-designed and which features are usable enough to stay. In the next chapter I discuss the design changes that were made to the GLI.

Chapter 6
Elements that were re-designed in the GLI

6.1 Introduction

In this section I discuss the design changes that are necessary to make Greenstone's Librarian Interface (GLI) more usable for senior users. These changes are inferred from the results of the Personal collection study and the Greenstone usability study, as well as aspects covered in the literature review. First I review the generalised design changes that are necessary to make the GLI more usable for seniors as found in the Greenstone Usability study in chapter 5. Then I will discuss in more detail which changes were applied to the overall GLI. These are changes that apply to all the panes of the interface. Next I will discuss the design changes to each of the individual panes, discussing how I came to these re-design decisions and what possible implications they will have for senior users. A description of how these design changes were implemented can be found in appendix D. After that I describe the changes that were made to the menu of the GLI and then the features that will be pre-set in the GLI any time a user changes the GLI mode to senior. Then I will wrap up the design changes by discussing RedRock, which is a colour scheme that was originally created for the senior interface, but in the end was not included. I will be discussing its design and the reasons for its exclusion. The last design change is more of a forward not to the Future work section as I discuss the possibility of extending the existing Greenstone help system. Finally I will summarise all the design changes and results from the studies. Below I discuss the most commonly occurring changes that were made to the interface and discuss how I came to these design changes.

6.2 Overview of design changes/major issues

As the Greenstone interface is rather large and testing each aspect of the interface would be cumbersome, I decided on an exclusive design method [13]. This meant that I found out the most common aspects that were difficult, developed a summary of the most necessary changes to the interface and then applied these changes to the entire interface.

6.3 General changes

6.4 Spacing

It became obvious early on into the Greenstone Usability study and through previous research that spacing in an interface can be a stumbling block for a senior. If panels and objects are not clearly separated from each other then senior users can have a great deal of trouble navigating and using the interface. The Greenstone interface suffers from a lack of space. There many of options on the pane of the interface and the pages can become cluttered. This leads to the problem of spacing as the panes in the interface run right to the edge of the window, and there are only small gaps between buttons and other objects.

I used two different distances for the spacing of the panes. I had decided, after some experimentation, to use a distance of 10 pixels to separate the main panel of each pane from the outside of the applet. I then used a distance of 5 pixels to separate the objects within the main panel. I felt this was a sufficient distance so as to stop senior users from over shooting an object and so that they may distinguish where objects separate. In addition, 10 pixels was also a sufficient distance so that all of the options on the panes can be displayed at a good size. The GLI opens at a size of 800 by 450 pixels, which means that if the spacing is too large then the objects are decreased in size to accommodate. However, as senior users often have eyesight trouble and may want to maximise the window, I had to be sure that 10 pixels was still a sufficient distance in full-screen mode. This was found to be the case as the objects had clearly been visually separated.

Download	Pane was removed
Gather	Gather Documents
Enrich	Describe Documents
Design	Organisation of Documents
Create	Build Collection
Format	Customise Collection

Table 6.1: New Pane names

6.5 Wording

The most common complaint found during the Greenstone usability study was about the terminology in Greenstone. Every user commented about how the wording of Greenstone is confusing. Many of the users suggested explanations of each term be placed next to that term, however adding an explanation next to all of the terms would clutter the interface very quickly. In the end I decided that the best solution was to change the terminologies as this was a very quick and easy process. Each pane has had some wording in it changed, but the most obvious word change, is to the names of the panes, as this affects all of the panes. Many users found the names 'Enrich' and 'Create' to be the most confusing, however no pane was without a complaint of it's name. In Table 6.1 I list the old pane names and the new more descriptive names. While the names are one word like before, they are much more understandable and intuitive. The removal of the Download pane is discussed later in this chapter. These are just an example of some of the wording changes that have been applied throughout the collection. Most wording changes are specific to a pane or an option, and are too numerous to describe them all.

6.6 Highlighting colour

Before I began the Greenstone Usability Study, the previous research and my discussion with people about senior users with trouble of an interface suggested that the colour of the interface would have to change [11]. However the results of my studies suggested that this is not the case, and this is discussed later in Chapter6.12. I found this not to be the case, and is discussed in more detail later in this chapter (RedRock). However the Greenstone Usability study did provide me with one important colour change that applies to most of the panes. The colour used to

highlight a selection in Greenstone is a shade of blue, and while this is a nice colour, has some design flaws. These flaws can best be shown when considering the Gather pane. The Gather pane has two tree structures in it, the left hand tree has a background colour of light blue, and the right hand pane has a background colour of light green. When a user selects a document on either tree, the document is highlighted in a medium shade of blue and has a thin black box placed around it. While this highlighting works well on the right hand tree, it can cause confusion on the left hand tree with the two shades of blue. As both trees are built using the same tree structure I felt it was best to choose a highlighting colour that was appropriate for both trees. In the end I settled upon using the colour white as it stands out against both background colours and contrasts nicely with the text colour of black. This change of tree selection colour applies not only to the Gather pane, but also to the other panes that use trees such as the Enrich pane.

6.7 Replace icons with text

The GLI interface has some nice colours and icons in it. In particular it has icons representing each pane, next to the pane title. While nice, these icons have been known to be a distraction and source of frustration for senior users. Both the previous literature and the results from the Greenstone Usability study suggested that senior users do find icons to be a nuisance. For the reasons I decided to remove almost all the icons from the GLI. While the icons removed are particular to each pane, there are a series of icons that span each pane and therefore apply to the whole collection. These icons are the pane icons. These icons represented each pane, and while the looked nice, the participants in the Greenstone usability study did not find their meaning to be intuitive. For these reasons I decided to remove them fro each pane and left just the panes title. While this does detract from the look and feel of the interface, it increases the usability for seniors.

6.8 Addition of Senior Mode

The flexibility of Greenstone is one of its attractive features, and was one of the reasons I decided to write this thesis about Greenstone. The GLI has a convenient

option in the Preferences menu that allows the user to change the mode of the interface. There are four default modes with varying degrees of complexity (see Greenstone description). This ability to change modes allowed me to easily and simply enter a fifth option called 'Senior mode' which allows the user to switch to the new Greenstone interface seamlessly from the old Greenstone interface. This feature also allows the user to switch back to the old librarian interface (called Librarian) and then they will have access to any features not available in the Senior mode.

6.9 Panes

6.9.1 Panes to remove

There was only one pane which I deemed would be unnecessary for senior users and removed. This pane was the Download pane. The Download pane's intended use is to download internet websites and webpages. Having spoken to the senior participants in my studies I ascertained that senior users would most likely use files from their own computers, files that they had created themselves or collected before hand. Many of the collections that seniors expressed an interest in creating were personal collections of personal content, such as a collection of all their photos taken throughout their life in the pastime of amateur photography.
This and the complexity of the Download pane led me to the conclusion that it just was not useful for seniors.

6.9.2 Gather Pane

A specific problem that I identified before the Greenstone usability study was the dependence of adding documents to a collection using the drag and drop method in the Gather pane. My understanding of previous research in the area of seniors computer usability led me to believe that an action that was common to a younger experienced user was no necessarily known or well liked by a senior user. Because of this I decided to put a question into the Greenstone usability study regarding this issue. The question asked the participants if they would prefer the drag and drop method or two buttons which let the user add or remove selected documents from

the collection. Almost all the users said they would prefer both methods or that they had no trouble using the drag and drop method. I observed that two of the participants had trouble with the drag and drop method, both used a double click when trying to select the highlighted file, and one participant had never used the drag and drop method, even though they met the requirements o the study, which was a good level of computer experience.
For these reasons I did include two extra buttons. These buttons were labelled 'Add to Collection' and 'Remove from Collection'. I did not remove the drag and drop ability of the program, and instead decided that the interface was best usable with both options.

On the Gather pane there are two tree structures, representing the workspace (user's computer) and the collection. At the bottom of both of these trees was an option that allows the user to filter the type of file that is displayed in the tree. By default this option is set to show all files. I felt from the beginning that this would be an unnecessary feature. During the study I observed the participants navigating the trees to find a file (they were given the type of document as well), however none of the participants used this filtering option. When I asked a few participants about it, they said that it may be useful but they have never used it, but knew of it.
From this I decided that this filtering option was an unnecessary option that was cluttering up the screen and would seldom see use in the senior user group. Therefore I removed this option from not only these two trees but also from the collection tree on the Enrich panel.

One of the first issues raised by my reading of previous research (Chapter 2) was how the use of icons as an identifier on an object could confuse the user. Hawthorn [11] discusses how having text to identify an object, such as a button, was best.
There are quite a few icons used throughout the Greenstone interface. However the only buttons where just an icon is used as the identifier are on the Gather pane. These tow buttons are the 'Create new folder' button and the 'Recycle bin'. Like all buttons in Greenstone, these two buttons do have a tooltip, brief description, that appears when the user places the mouse over button, however through my observations in the Greenstone usability study it appeared to me that most seniors did not

know how to use the tooltip. When a tooltip did appear, most of the users would look surprised and go to an effort to read the description. They seemed to think that the tooltip was an instruction until I explained to them that it was in fact a description of the option. This reassured them and they then carried on with their task, so I decided to leave tooltips as they were.
As the senior users seemed to have trouble understanding what the buttons did without a simple name, I felt it was best to remove the icons from these two buttons and replace them with the test names of 'Create new Folder' and 'Recycle bin', as can be seen in fig .

The titles on both the workspace and collection trees were small and hard to read. None of the seniors showed any signs of having seen these titles and on a few occasions I was asked to clarify which tree was which. For this reason I changed the font on the title of both these trees to size 14 so that they were easier to read.

Another aspect of the tree views that I thought may be an issue for senior users was the use of the + and - symbols which were used to expand and collapse a folder. This is the equivalent of double clicking on folders to expand and collapse them. In the Greenstone usability study I asked users if they knew how to use these icons and if they would be likely to use them. Most of the participants said they were not likely to use them but felt that they were a useful tool and that they may use them in the future. In the end I felt that the icons were small enough to not distract or confuse senior users too much, and could be of use and therefore left them in the interface.

6.9.3 Enrich Pane

As mentioned in the above section, I found that the filtering option on the collection tree view can be a distraction to senior users and would be a tool that is unlikely to be used. In this window I also remove the filtering option from the collection tree view.

A feature of Greenstone is metadata. The metadata elements are specified by metadata sets. There are many metadata sets in existence and as part of the Greenstone suite of software, a metadata manager is included. Creating and modifying metadata sets is a complex process and this process seemed too complex for seniors. The Enrich pane had a button which linked to this metadata manager. I decided it was best to remove this button, and like any other options that have been removed or had access limited to in the senior GLI, the user can change the mode to the default Librarian mode to make any such changes.

As with the Gather pane, the title on the collection tree was too small so the font was increased to size 14.

The default size of the Greenstone Librarian Interface is 640 by 480 pixels. This is a moderate sized window, but as I had expected, it was too small for the senior users. Most of the users did have trouble with the default size, but when they maximised the interface to the maximum window size, they found the interface harder to work with. The biggest trouble when the GLI was maximised was with the Enrich pane. The problem was that the Enrich pane has two main sections of the page which are split vertically down the page. When the page is maximised this vertical gap between the sections is no longer in the middle of the page, but instead gives the right hand section 2/3 of the screen, which made it difficult to navigate through the collection tree on the left hand side of the page. I quickly re-weighted the page so that the vertical split was evenly down the middle and the maximised window was much easier to use.

The biggest change on this pane was to do with the display of the metadata elements. Metadata is specified using two values. The first value is the element, is the title of the metadata the user is entering, such as title, description, date etc. The second part is the value, is the value that is assigned to the element, such as 'My diary', 'My diary form the first fifteen years of my life' and '1980-1995', etc. Currently the metadata elements and values are displayed in a table with a panel, called 'Existing values', below that displays other metadata values that were entered for the currently selected metadata element. This panel was a very confusing aspect

of the interface for the senior users. Most users thought that this was where they were to type the value for the metadata. When I explained the use of the panel, most users thought that it was not useful to them, and Participant G suggested replacing it with an autocomplete box that drops down from the field the user is typing in, like in the text and form searches covered in the finished collection HTML interface.
In the end I decided to remove the 'Existing values' panel and use autocomplete drop down boxes in the table. This should reduce the confusion in the pane, and keep the features of the interface.

6.9.4 Design Pane

The design pane has four options sections; plugins, search indexes, partitions and browsing classifiers. Partition indexing (see Section 4.6) is currently blocked from the librarian mode, on which I have based most of my modifications. In the case of the senior interface, I left partition indexing blocked but in addition I also removed the link to it and search indexes. I removed the search indexes as well because the search types are to be pre-set (discussed below in ...).

I dealt with plugins (see Section 4.6) a little differently. During the Greenstone usability study occasionally the issue of plugins came up when adding files to the collections. When I explained what plugins were to the participants they understood what plugins were. I explained to them that we would set up the interface with the plugins for the most common types of documents that are likely to be added to the collection, as determined by the personal collection study. Instead of removing the plugins option I decided to leave the reference to it so that the users may know where any possible trouble regarding plugins could be resolved. However I did block access to the plugins options, and instead used a message which directed the user to change the mode to Librarian if they wish to edit the plugins.

AZCompactList	Compact list ordered by A to Z
AZCompactSectionList	Compact list of categories ordered by A to Z
AZList	List ordered by A to Z
AZSectionList	List of categories ordered by A to Z
AllList	Simple list of all documents
Collage	Collage of images
DateList	List ordered by date
GenericList	Generic list of categories ordered by A to Z
HTML	Link to a web page
Hierarchy	Organise as Hierarchy
List	Simple list
Phind	Phrase Searching
RecentDocumentsList	Recently Modified List
SectionList	List ordered by categories

Table 6.2: New Classifier names

Browsing Classifiers

The biggest trouble that arose from the Greenstone usability study with the Browsing classifiers section was the language. All the participants had trouble with the names of the classifiers, and suggested renaming the classifiers. For that reason I have renamed all the classifiers as the following:

This information confused the participants in the Greenstone usability study and cluttered the page. For this reason only the names of the classifiers would be displayed. In addition, when adding a classifier you are normally presented with an array of parameters of the classifier in a pop-up window. Yet again the participants deemed these options as confusing and unnecessary. The only option which I left was the buttonname (the field that specifies the title that the classifier appears under in the finished collection) parameter.

6.9.5 Create Pane

There was a big design change with this page. All previous pages had been split vertically, not all necessarily evenly down the middle of the screen, but still vertically. The Create pane was the exception to the rule. Hawthorn [11] discussed how a consistent interface design can enhance the usability of an interface with respect

to senior users, so the decision was made to re-align the Create pane.
This pane was then split vertically like the rest of the panes. As many of the build options were deemed too complicated for senior users, only the option maxdocs (see Section 4.7) was kept. This option was moved to the left hand pane. In addition the 'Build Collection', 'Cancel Build' and 'Preview Collection' buttons were also all moved to the left hand pane. The right hand pane was left to contain the build statistics. As some participants during the Greenstone usability study declared these statistics to be annoying, a checkbox was included that can turn on or off these statistics. In the lower part of the right hand panel, a label was added to replace the pop-up box that appears once the collection is built. The reason for this is that throughout the Greenstone usability study the participants continually clicked off the GLI, usually on the browser, and this click resulted in any pop-up boxes being hidden. This confuses senior users greatly as they may then go back to the GLI and try to click on another option but can't until the pop-up box has been closed. This was a major issue, therefore the dialogue box that informs the user that the build has finished has been incorporated into the create pane. This leaves just the progress bar to be re-positioned. To keep the position of the progress bar consistent with the Gather pane (which has the other progress bar in the interface), the progress bar was placed at the bottom of the pane.

Another big problem with this pane was the way that the build options were obscured when the panel divider was not in a set place on the page. The best way to get around this, and also because that the build buttons had been moved to the left hand pane, the divider in this pane was set at a fixed place and was not able to be moved by the user. This prevents any options from being accidentally obscured and ensures that the user can see and use all options.

The original Create pane contained two more options: incremental rebuild and complete rebuild. Incremental rebuild meant that only settings that had changed were rebuilt and complete rebuild meant that the entire collection was rebuilt. The default option was the complete rebuild option. I could not foresee any great advantage to having this option as it presents more options and confusion on an already complex interface. For this reason I removed the options and left the complete re-

build as the default.

6.9.6 Format

Similarly to the design pane, the Format pane had some options which were deemed to be too complex and unnecessary for senior users. The options that were removed were Search and Translate Text.

6.9.7 Format Features

The Format features option lets you describe how specific metadata are displayed in a classifier. This section allows the user to alter the appearance of their collection and customise it to their liking. However the way in which you alter the appearance is by specifying the order metadata is displayed in, the font of the metadata using XML. It is reasonable to say that we can expect senior users to learn how to use XML statements. Therefore this pane has been changed to allow some standard changes to metadata. These standard changes are; italicisation, bolding, underlining, font and text size.
This option in the Format pane had some of the most re-design changes of the entire interface. The only part of the old interface that was kept was a combobox which lets the user select which classifier they want to format.

The buttons on the Format features panel were; 'Add Format', Remove Format', 'Reset to Default', 'Undo and 'Redo'. There were also three drop down boxes that let the user first specify which feature to edit, then which classifier the edit should apply to and finally what type of action they wanted to perform. This is a very complex set of options and Most of were unnecessary after the changes above had been implemented. In the end the 'Reset to Default' button was kept and all others removed. Another button titled 'Save changes' was then added so that the users may be able to save the changes they had made to the classifiers and metadata.

New...	Create new collection
Open...	Open an existing collection
Delete...	Delete a collection

Table 6.3: Names

General Format options

This pane had few changes to it. The old pane had the following fields:
The Creator's email field was retained while the maintainer's email field was removed, as logically to seniors, the creator is the maintainer.
The URL to about page was also kept but it was renamed 'Image to the collection's main page'.
The collection title and description fields were also kept, as was the check box specifying whether the collection is publicly accessible.

6.10 Menu items

I examined all of the options in the file menu and assessed whether they were likely to be used by seniors. I found the export and File associations to be a likely problem for seniors so removed them from the interface. I kept the other options but I re-worded all of them as shown in table 6.10.

In addition I removed some options from the preferences window. I kept mode and general panes. These two panes held the most pertinent information and were easily usable panes to begin with. The other two panes, 'Connection' and 'Warnings' were not necessary to a senior user using the collection and so were removed.

6.11 Preset features

By default Greenstone searches extracted metadata, but not the metadata entered manually. To search this metadata the user need to specify which metadata to search upon and what to call this search, such as titles or filenames. As the search indexes window was a window removed during the re-design process because of its complexity, this option is pre-set when the metadata set for the collection was chosen.

When the user specifies which metadata set they want to use on the collection then a script will run which will re-assign each of the search indexes to search upon the extracted metadata value and the manual metadata value. This is so that when a user searches for a documents title, Greenstone will not only search the extracted metadata, but also the manually assigned metadata. The name of the search field would then be set to the name of the metadata element.

As described above in the Format features section 6.9.7, the original XML editing window was removed and was instead replaced with a table that had default options classified by combo boxes and check boxes. The use of these pre-determined options means that script is used to enter the format changes into the collections XML file. The script parses the XML file and finds the correct place to insert the pre-set code for the option that was chosen. This allows easy, though limited customisation of the Format features.

The names of the classifiers were a big sticking point with senior participants. Not one of the participants found the current classifier names to be useful or intuitive. To modify the classifier names, I located the classifiers information file where the names of each classifier along with some parameters are stored. I copied this file for use for the senior interface. I then went into the copy and specified the new names for the classifiers where the old names had been. Then I specified that if the current mode is senior mode then the new classifier information file is used.

In addition to changes to the GLI I also created a new metadata set that reflected the types of documents and metadata that seniors would want to enter about their documents. These elements were determined form the results of the first study (see chapter 2). Below in chapter 7 I discuss this metadata set in more detail.

The last feature that was pre-set in the interface was the removal of dummy text'. Dummy text is a Greenstone text file icon that appears next to images. This icon normally appears next to every document, and is used to open up a document, such as a PDF, in the Greenstone interface instead of using an external program. However this icon also appears for images, which have no text, and in this case the dummy text document is empty. To stop users becoming confused by an empty document it is good practice to remove the dummy text. The removal of dummy text is a simple process completed through the format statements using XML. Whenever the user changes the interface to senior mode then this code is inserted into the collection

design. However it can only be removed by changing mode and removing it from the XML code directly. A feature that allows the user to remove the dummy text while in the senior mode is a possibility in the future.

One of the aims of the Personal Collection study, Chapter 3, was to ascertain what types of documents senior users would like to add to a collection. By knowing the most common types of documents that are likely to be added to a collection by a senior user we can know what document plugins they are most likely going to need. Greenstone already has plugins for the most common types of documents, such as images, PDF, HTML, word documents, and more. While the results from the personal collection study showed that the documents that are most likely to be added to a collection already have plugins pre-loaded in the old GLI, the participants also suggested that they would like to be able to add video and audio. These plugins are not currently pre-loaded into the GLI. This is achieved by pre installing the RealMediaPlug plugin into the new GLI interface for seniors. The RealMediaPlug plugin is used to play RealMedia files which can be either video or audio. However at the moment this is the best plugin available for both audio and video, however new plugins are in development.

6.12 RedRock

In the literature review section (Chapter Two) I discussed how senior users have trouble with discrimination of colours in the blue and green wavelengths. This was a considerable design issue as the current Greenstone librarian interface is understandably green, with blue as well. Before performing the Greenstone usability study I decided that this was likely to be a change that I would need to implement so I created a new XML configuration file for Greenstone that had a different colour scheme, based upon the red and brown wavelengths instead of blue and green, named RedRock (shown in figure 6.1).

During the Greenstone usability study I decided to see what the participants thought of the current colours and see if they had preference for any particular colours to replace the green and blue.

To my surprise, and that of other people who have performed usability testing with seniors, the participants preferred the green and blue colour scheme. In fact one

participant even said that they "preferred the pastel colours, these", referring to the current Greenstone colours. The only issues they had with the current colour scheme was the use of light blue for highlighting documents. It was suggested to me by one participant that "'highlighting colour be made grey".

In the end I decided to stay with the traditional green and blue of Greenstone as the participants obviously had a liking for it. However I feel that it would be a good idea to include an option where the user can choose between the two colour schemes, however for the purposes of this thesis I could not implement it in time, therefore I will discuss it further in the future works chapter.

Figures 6.1 to 6.6 show the colour scheme differences between the original GLI and RedRock.

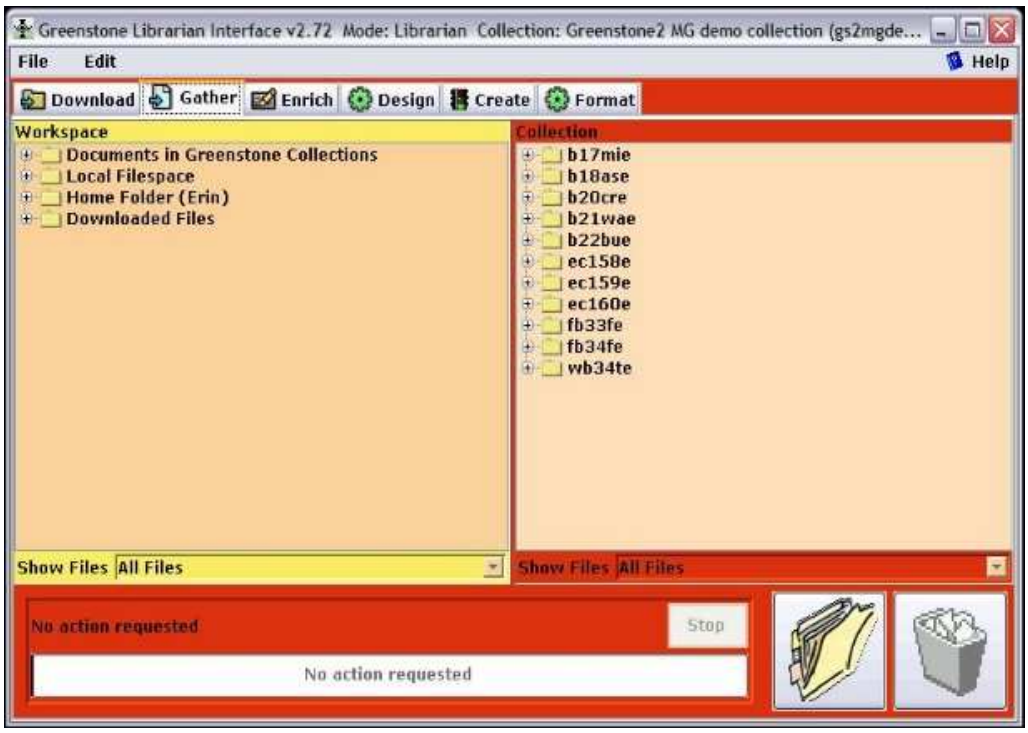


Figure 6.1: Original Gather pane in RedRock

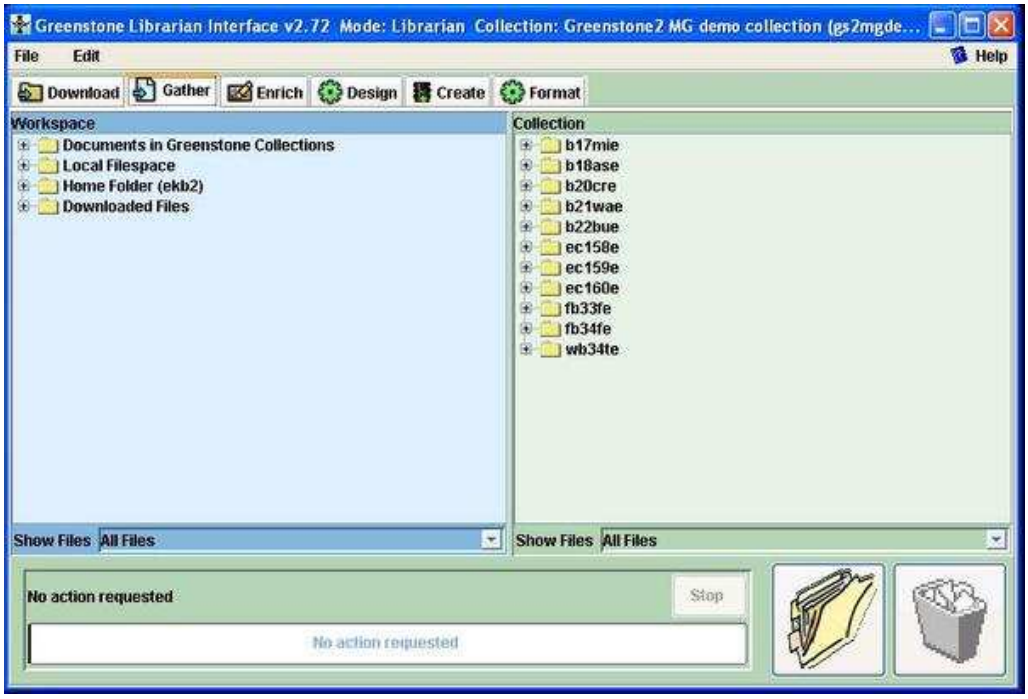


Figure 6.2: Original Gather pane

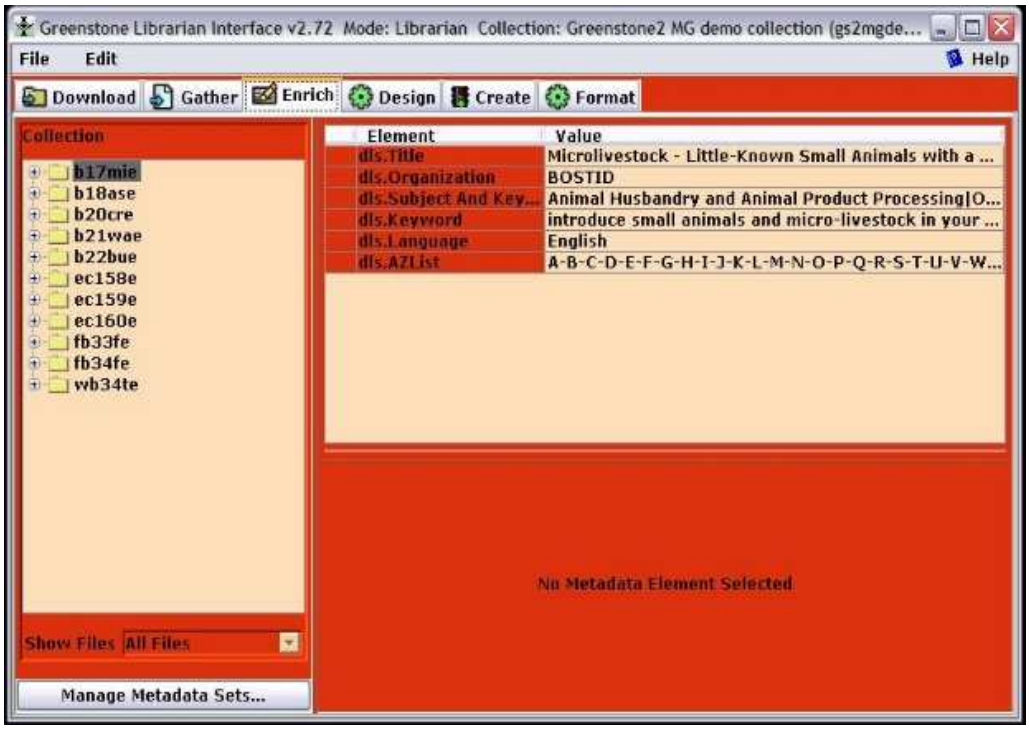


Figure 6.3: Original Enrich pane in RedRock

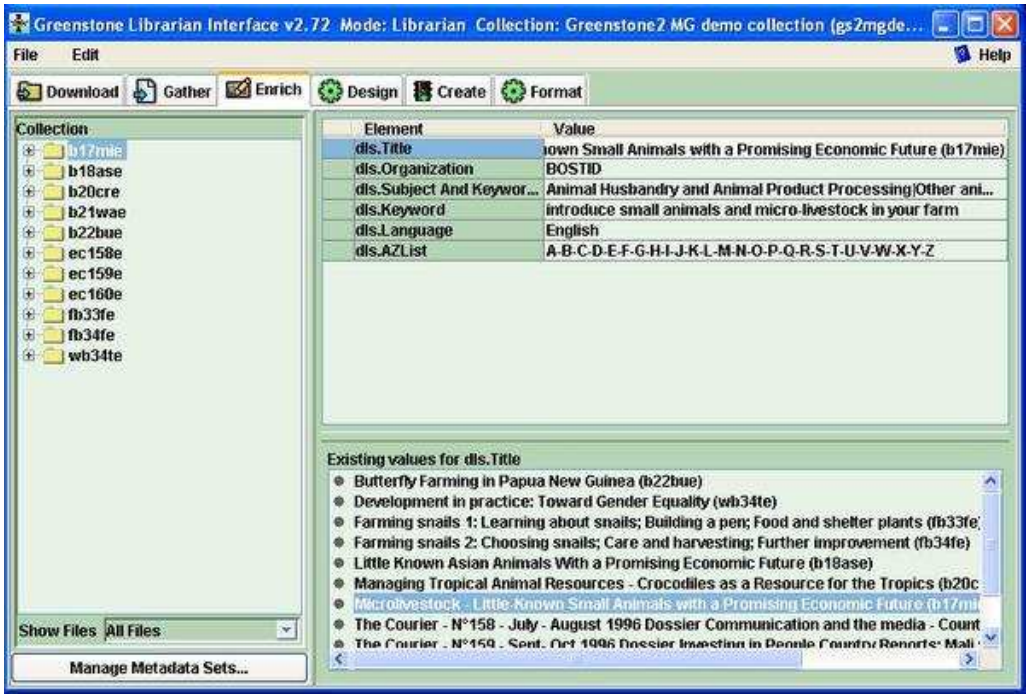


Figure 6.4: Original Enrich pane

Figure 6.5: Original Create pane in RedRock

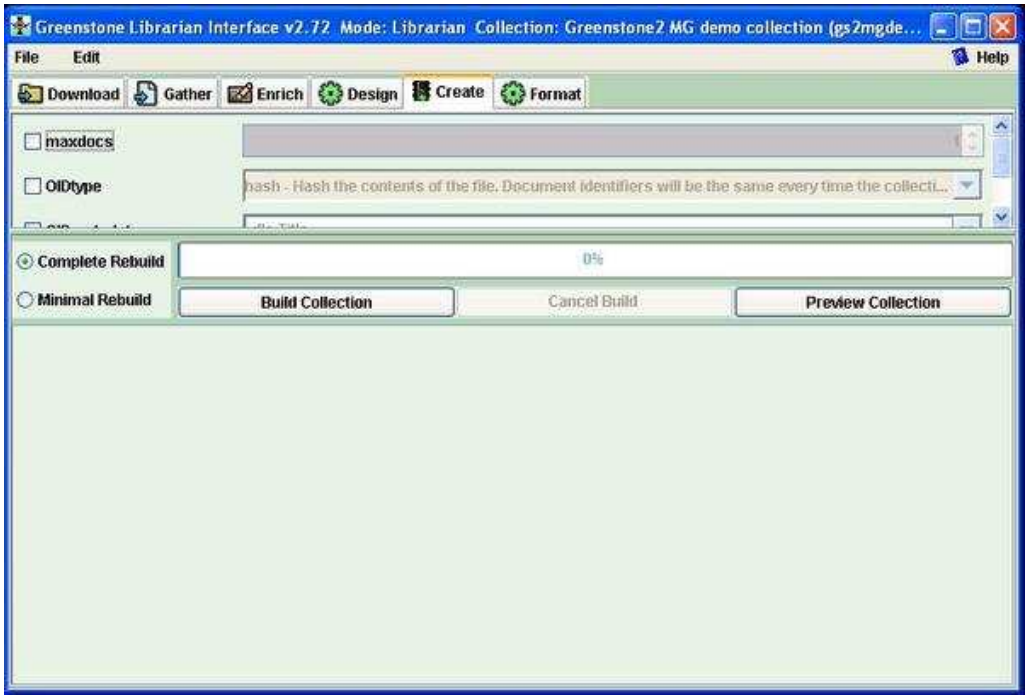


Figure 6.6: Original Create pane

6.13 Help guide

The most resounding result from the Greenstone usability study and from previous research is that senior users perform best when they are given clear and concise information. In regards to the Greenstone Librarian Interface this means a help guide. Almost all users said at some point that if a difficult term or concept was described to them in a manual or help section, then they would have much less trouble.

6.14 Conclusion

The many design changes that I have discussed here have been carefully considered with the aim of improving senior usability for the Greenstone Librarian Interface. The changes that are likely to have the most affect on the usability of the interface are the spacing and change or wording design changes. These two re-designs should make the interface much more accessible for the senior user, both in the senses of physical usability and mental usability. Task complexity can be a big issue with the Greenstone software, however I think the simplification of tasks, such as adding a classifier combined with a good help system, such as already exists in Greenstone, task complexity is no longer an issue. Overall I think these interface design changes are effective and will make using Greenstone much easier for senior user.

6.15 Screenshots of the Senior GLI

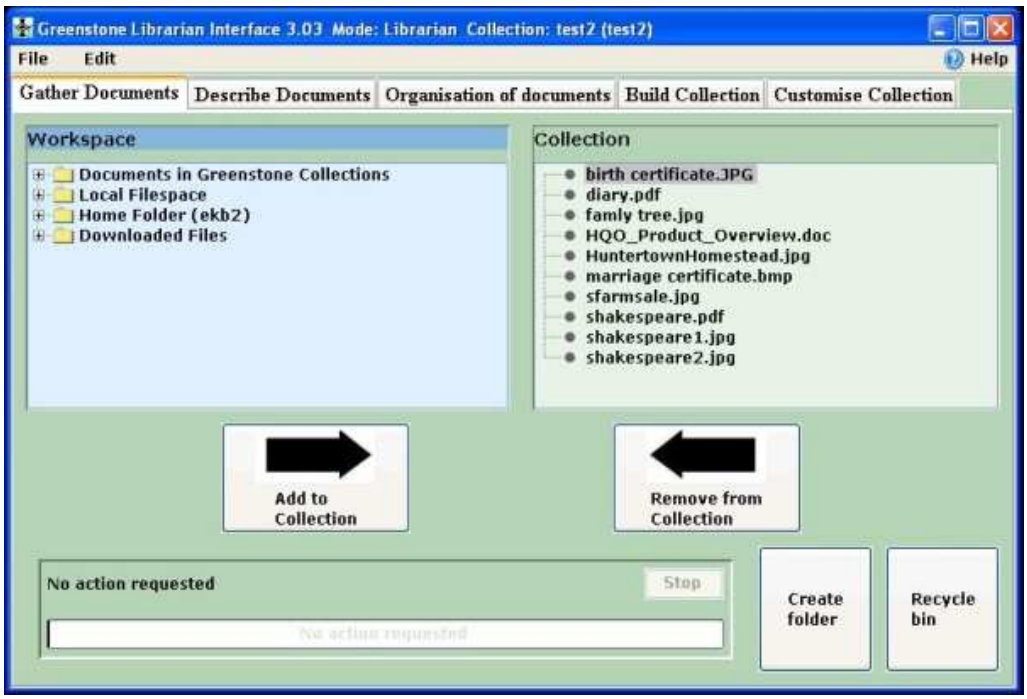


Figure 6.7: Re-designed Gather pane

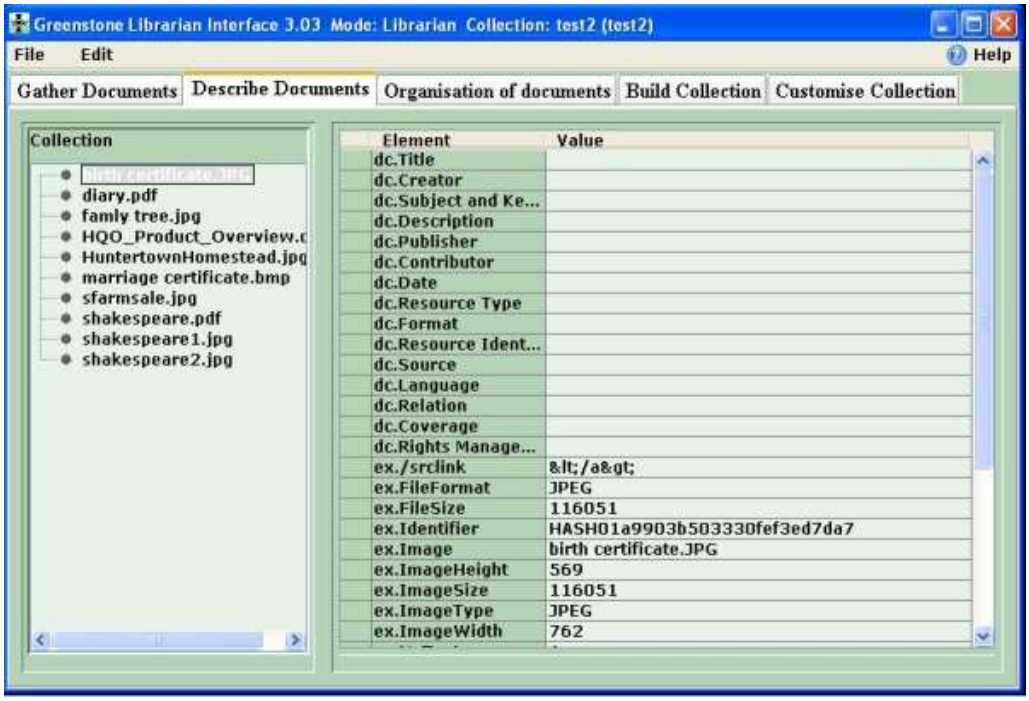


Figure 6.8: Re-designed Enrich pane

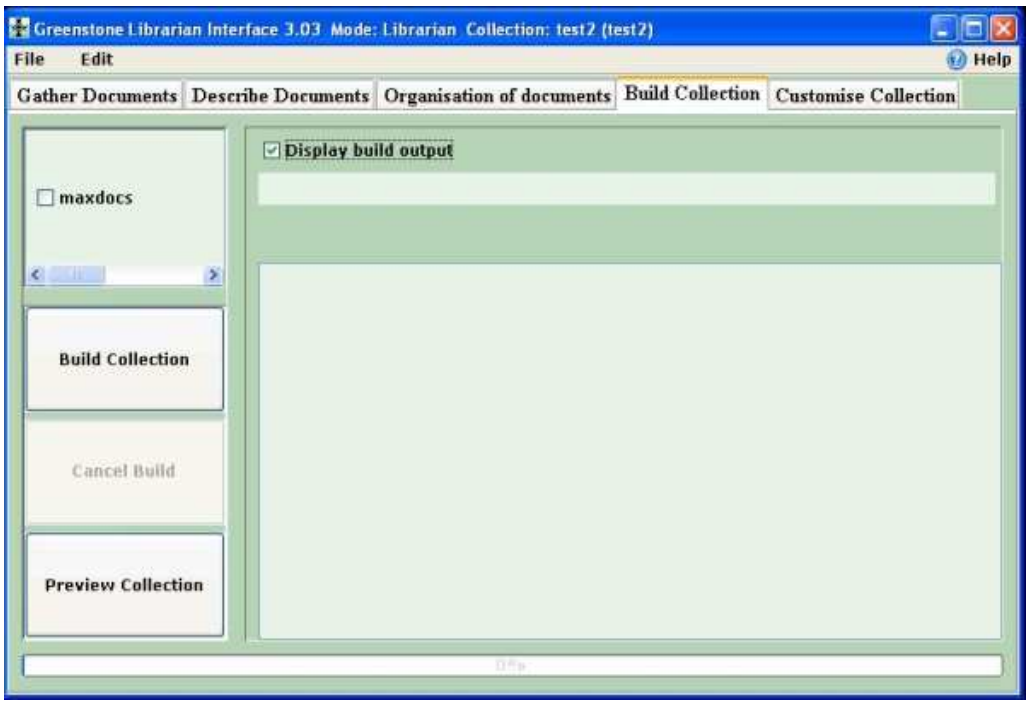


Figure 6.9: Re-designed Create pane

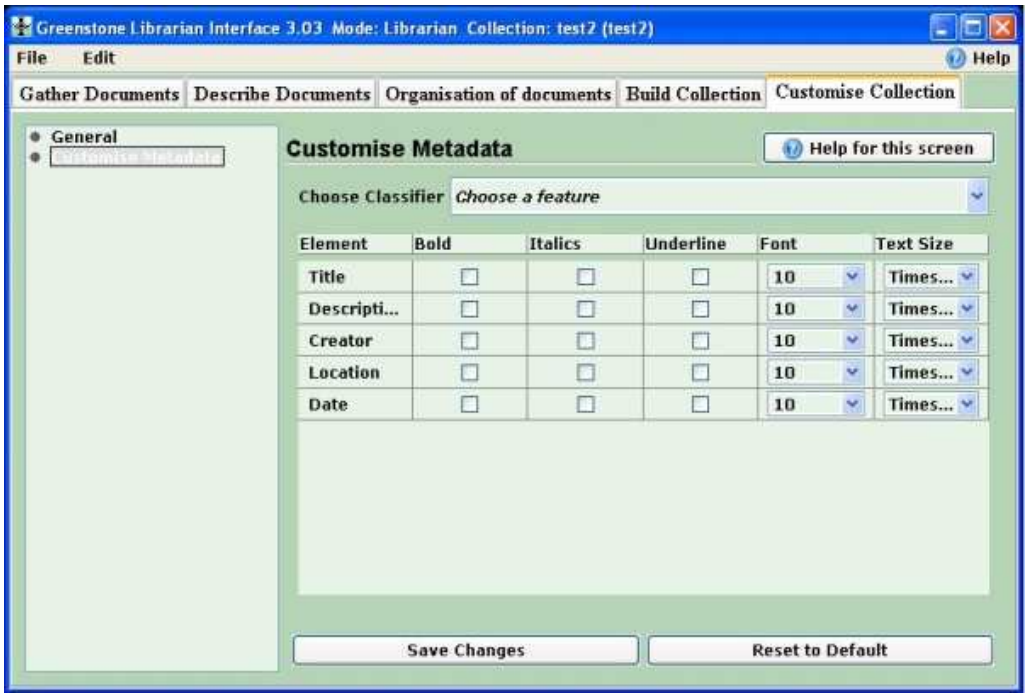


Figure 6.10: Re-designed Format pane

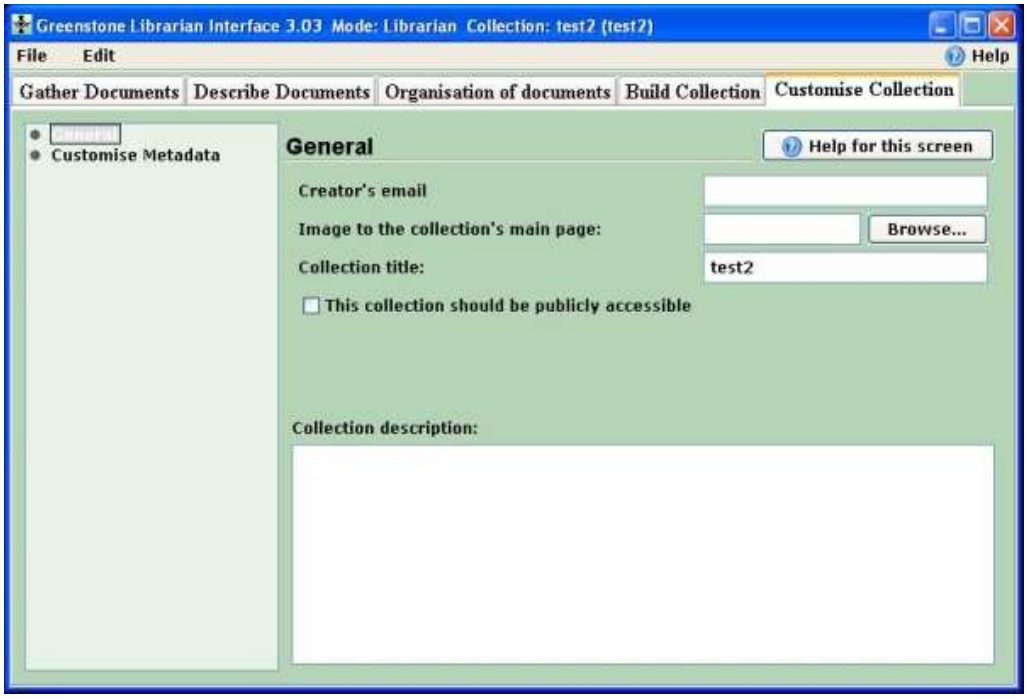


Figure 6.11: Re-designed General panel

Figure 6.12: Re-designed Browsing Classifiers panel

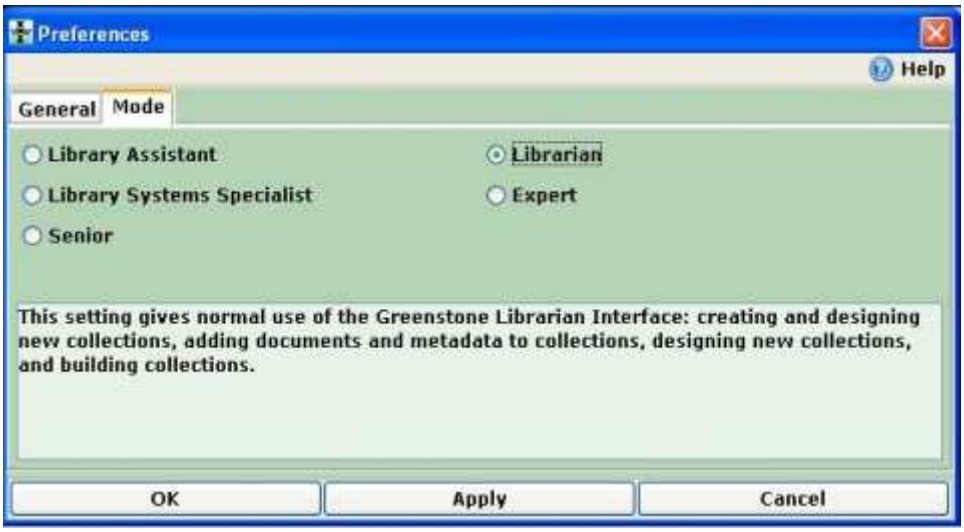


Figure 6.13: Re-designed Preferences window

Chapter 7

Senior Metadata Set

Metadata is an essential element of Greenstone. It is used for searching, indexing and organisation. The default metadata set of Greenstone is the Dublin Core metadata set and contains the most likely metadata elements. In the Personal Collection study, Chapter 3 participants were asked to write descriptions about documents they would like in a collection about their lives. These descriptions were used to form the elements for a new set of metadata, the senior metadata set which inherits some of its elements from the Dublin Core set. This chapter describes, first the Dublin Core metadata set, and then the senior metadata set, discussing each element in turn. For a description of the Dublin Core metadata set refer to the Personal Collection study, Chapter 3.

7.1 Senior Metadata Elements

In this section I will describe the elements of the Senior Metadata set and compare the to the Dublin Core metadata set where applicable. As with all metadata in Greenstone, multiple values can be assigned for each element.

- Title

  This metadata element is identical to the Dublin Core equivalent. It represents a user defined title for the document. During the Greenstone usability study it was ascertained that senior users had no trouble with this metadata element and felt that it would be an advantage to have such an element.

- Description

  This element, like title, is also identical to its Dublin Core equivalent. In the Personal Collection study 3 all users wrote at least one line of a description that cannot be related to a Dublin Core element. For this reason it is probably the most essential metadata element out of the entire set.

- Subject

  This element is a little different from its Dublin Core equivalent. The Dublin Core metadata set has an element called Keywords and Subjects, however this was confusing to seniors as they could not see how it could be both keywords and subjects at the same time. After the Personal Collection study 3 it became apparent that seniors didn't see any need for the keywords option as anything that would describe the document could be said when writing the description and subject. Therefore only subject remains.

- Date or Text Identifier

  With this element there is a big difference between the Dublin Core metadata set and the Senior metadata set. Dublin Core had a date identifier that could be used with the DateList classifier. However the Personal collection study raised some issues with how users prefer their collections displayed. They preferred a timeline view, for which Greenstone does not have a classifier. Such a classifier would have to allow the user to organise documents in the collection using both date and text identifiers, assigning a weight to each date and text item so that the list is ordered correctly (Chapter 8). For this reason I included the date and text identifier element so that this timeline classifier would be usable.

- Date and Time

  In addition to dates, some users in the Personal Collection study 3 also decided to describe their documents by time, such as date. In most cases these documents were photos; however you can imagine such items as entries from a journal also having a time. This is not an element presented in the Dublin Core, and considering how precise a lot of documents such as journals and letters are, this is a useful element.

- Type of Document

  This element is a combination of two Dublin Core metadata elements, Format and Type. This element is used to describe what type of document the selected document is. This could be any text that the user entered, such as; book, journal, photo, audio etc.

- Location

  Another observation from the Personal Collection study 3 was that senior users also mentioned the locations of some documents. These locations are not filenames, but locations of where the document was created. As the most common document type in the Personal Collection study 3 was photos, this element is a direct result of this abundance. Most photos included in their descriptions, a mention of where the photo was taken. These could be an address or a location relative to another point. This element is an attempt to make classification easier on the user as they don't have to write long descriptions containing this information, but instead can enter it separately.

- People in the Document

  This element is also a result of the abundance of photos in the Personal Collection study 3. People in the document is a metadata element where the user can list the people that the document relates to. This is most commonly, the people in a photo. Where this element is best used with photos, but it can also be used with other documents, such as a journal to describe the people mentioned in the journal.

- Author

  This element is very similar to the Creator element of the Dublin Core metadata set but is essentially a re-worded version. Senior users found the term Creator a bit domineering and suggested a gentler term. The author is the person that created the document and can be such things as the photographer of a photo, the writer of a letter or even the URL of the website where a document was found.

7.2 Conclusions

The Senior metadata set is easily comparable to the Dublin Core metadata set as I used the Dublin Core metadata set as a basis for designing the senior metadata set. Taking into consideration, the types of documents that senior users are most likely to add and the types of descriptions that they would assign to the documents, this new metadata set should work well for seniors. The senior metadata set does not

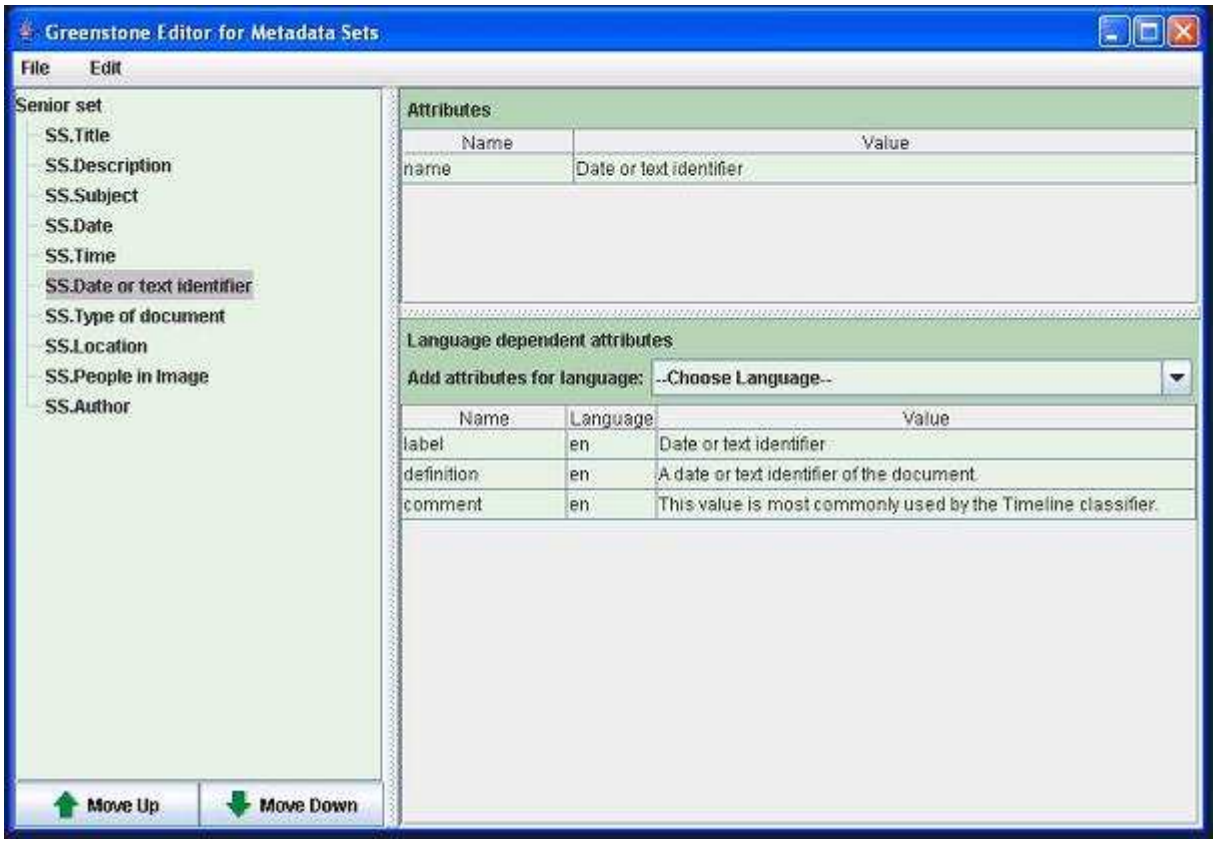


Figure 7.1: Senior metadata set

restrict any type of documents but does give a few new metadata elements which relate mainly to photographs and images. The reasoning for this is that photos were the most common document found in the Personal Collection study (Chapter 3).

Chapter 8
Timeline Classifier

8.1 Introduction

A classifier is a tool in Greenstone that lets the person creating a collection specify how the documents can be ordered in the resulting collection. There are many ways that documents can be ordered, but the order is based upon the metadata of the document.
The process of creating a classifier for Greenstone is complex. Due to the constraints of time and the complexity of the task, the Timeline classifier presented in this chapter is a hi-fidelity prototype of the final classifier.

8.2 Personal Collection study

As part of assessing what types of documents the participants would like to have in their collection I undertook a cultural probe study [6] as is described in Chapter 3. It was designed to ascertain what types of documents participants would like to add to their collection, what type of metadata they would add with their documents and how they would like their collection to look. When trying to discover how they would like their collection to look and ultimately how they would like it organised I devised a method of labelling all the items in the collection with a simple title or description. This label was written on a small sticky note. The sticky notes were then arranged on a large piece of paper in the way the user wished the collection to look. What this also told me was how they wanted the collection organised. All the participants arranged their collections in a timeline format. Not all participants used dates; some of them used identifiers such as my childhood or my married life. And some included a mixture of these so that dates such as "1960s" and "80s to now" were included in the arrangement. This left me with a dilemma; could the

current Browsing classifiers produce this arrangement satisfactorily?

8.3 Timeline

A timeline is a representation of a series of objects in a chronological order and are typically created on paper. What this means is that they are ordered in a specific fashion, as is commonly the case with timelines, such as time. However, not all of the objects in the timeline need to be a date. The best way in which a timeline is organised is using a 'weight' this is a value, such as a number, to assign priority to order the documents. A timeline's appearance is typically in a single horizontal line. When creating a timeline in an interface timelines that are used in interfaces a scroll bar is used so that the user can scroll across the page and see all the documents.

8.4 Existing Classifiers

The following is a list of the current browsing classifiers included with Greenstone.

- AZCompactList
- AZCompactSectionList
- AZList
- AZSectionList
- AllList
- Collage
- DateList
- GenericList
- HTML
- Hierarchy
- List
- Phind
- RecentDocumentsList
- SectionList

Each of these classifiers has their own specialization, however the only ones to come close to what the senior users specified that they wanted in the Personal Collection

study 3 are the DateList classifier and the AZSectionList. the DateList classifier lists documents in a vertical layout, ordered by their date metadata element, whereas the AZSectionList classifier organises documents vertially based upon a metadata element specified by the user. There was one big deficiency in these classifiers, the users wanted to be able to display the items horizontally across the screen, like a traditional timeline, but there are no classifiers which can readily do this. In addition many of the users wanted to specify each period of their life using different identifiers, such as numerical and text. For example, Fig 3.4 in the Personal Collection study3.5.2 shows that the Participant B wanted to have a mixture of dates and text to represent each period of their life. Using the current classifiers the way in which you would have to do this is use a List classifier (or similar) and specify the date periods as text in the 'description' metadata element. This has a down side in that the user cannot organise the periods correctly as the list classifier organises the documents based upon a second metadata value which we would have to assign. For example to organise the documents using text and date descriptions, you would need to do the following:

- Assign the date to the description field
- Assign a number or text to a separate field, such as subjects and keywords
- Add a List classifier
- Specify the classifier to organise based on the description
- Specify the classifier to order by the subject and keywords.

This is not the most ideal process as it requires quite a few steps that could become simplified.

8.5 Design of Classifier

The Timeline classifier is designed to combat the issue discussed above, where participants of the Personal Collection study wanted to organise their collections in a horizontal view. Secondly this classifier is designed to combat the problem of having both text and date identifiers in the same classifier. The first thing I did when designing this classifier was to set up a horizontal scrolling view. The classifier applet

is plait into two scrolling panes. The First pane contains a list of all the categories for a metadata element. For example, 'my childhood toys', '1960' and 'my teenage years' all assigned to the metadata element 'description'. The top panel will then list 'my childhood toys', '1960' and 'my teenage years'. The second panel is designed to list the documents that have the currently selected metadata value assigned to them.

As this classifier was designed to deal with the metadata being both text and date based, there has to be a weighting system that allows the user to specify the order in which the sections are displayed in the top panel. As this is only a high fidelity prototype of the classifier I decided that pacing a numerical value, such as 1 or 2 before the metadata value in the GLI is sufficient to order the documents. However, for ease of usability this will be implemented in the future a list which the user can order in the dialogue box that contains a classifiers parameters. This classifier is designed to display the documents of a collection in

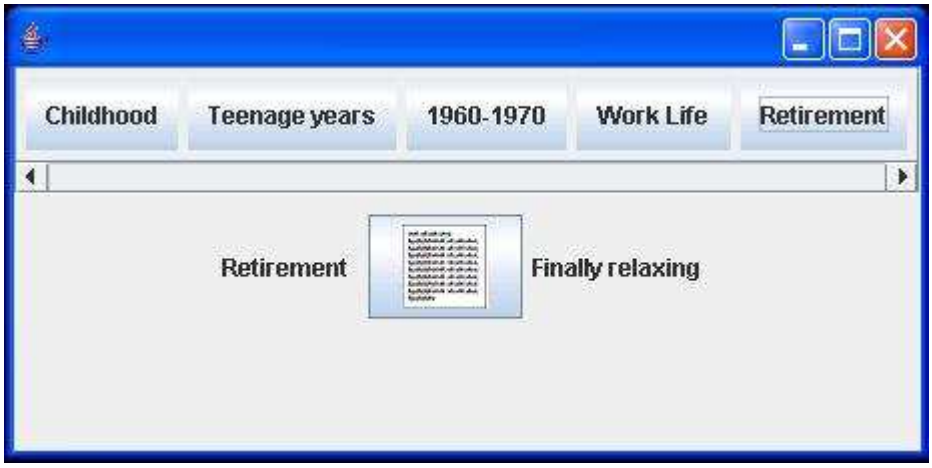


Figure 8.1: Early version of the Timeline classifier

Chapter 9
Review of the Senior Greenstone Librarian Interface

9.1 Introduction

This chapter is a review of the design changes that have been discussed in chapter 6 through 8. Throughout the process of performing the two studies (Chapter 3 and Chapter 5) described in this thesis and re-designing the interface I came across an interesting problem that (to the best of my knowledge) previous researchers had not encountered. I had great difficulty in acquiring participants for my studies. I contacted all local senior groups and social clubs, I put up posters around the university and emailed people that I knew could get the word out that I needed participants. But for a good majority of the year I had almost no responses. I even gave talks to some senior groups at the invitation of their presidents, but I still only ended up with a handful of participants. This lack of participants surprised me as I had had encouraging comments from the community at the start of my thesis. Eventually I managed to get a hold of the New Zealand Genealogical society, and this produced most of the eight participants for the Greenstone usability study. However by this stage the participant shortage had affected my target of what I had wished to achieve for my thesis and I was forced to re-think how to evaluate the software. A call for more participants would have taken at least another three months, as this was how long it took me to gather participants for each of the studies.

However I found an optimal solution when I reconsidered the content of the literature review (Chapter 1). During this literature review I had noted five essential aspects of an interface that need to be addressed when designing for senior users. These aspects were then formed into rules, and used to asses the usability of my interface. While this cannot be as effective as a full usability study (see chapter 5), due to

time constraints and participant availability this was considered adequate.
This evaluation is designed as a Guidelines review [2] that uses a set of rules to assess the usability of an interface. These rules give a clear and guided assessment of what is usable for the type of software that is being tested. In the case of this thesis, the rules have been created from previous research about senior usability (Chapter 2). A description of the rules for evaluation follows.

9.2 Rule One: Larger Spacings Between Objects

Senior users are known to have mobility issues [8], and while none of my study participants had any major mobility issues I would be remiss to exclude this aspect from the design rules. To make it easier for a senior user to correctly click on a target, the spacing between objects was increased, as in the current interface in some places there is not any definable space between objects. The increased spacing was implemented on all objects in all of the panes of the interface (Figure 6.7). Increased spacing was also included in the dialog and options boxes. This ensures that senior users will be able to clearly see the objects. In addition the extra spacing will make visual search, the process of searching for an object, of the interface much easier.

9.3 Rule Two: Larger Objects

This rule is largely tied in with the last rule. The aim of this rule is to reduce the number of targets that are accidentally clicked on and to increase visibility of objects. While it is good to increase the size of targets for these reasons, it must also be kept in mind that the objects in a page must be sized relative to each other, so that emphasis on a part of the page is not stolen by increasing the size of a rarely used button.
In the new Greenstone interface I increased the size of various buttons. In particular, the Build buttons (Figure 6.9) (Build Collection, Cancel Build and Preview Collection) have been made in better proportion to the rest of the options on the Create pane. This not only helps with the user being able to correctly click on the build buttons, but also helps keep all objects on that pane relative to each others

size. There are other implications for having larger objects. Any visual search of the interface that the user may have to make should be easier as objects are now larger and stand out more.
In addition to increasing the size of the objects, I also rearranged the alignment of other panels within the pane. For example, when the user maximised the GLI, the panes that contained JSplitPanes (where two panels are joined together and stay in proportion to each other) would become unbalanced. The left hand panels had less of a priority for space than the right hand panels and therefore the right hand panels took up most of the page. To fix this I re-arranged the alignment weightings of the panels so that they had equal spacing on the panes. This re-alignment meant that the pages are now well balanced, and this in turn meant that visual search of the interface should be quicker and easier.

9.4 Rule Three: Simplified wording

The biggest trouble that the seniors had with the interface was the wording. In some cases, before I had even started the first session I had participants telling me how annoying they found 'useless wording' to be. Their thinking was why do we need big words to describe simple things?. This is a big issue for seniors as they already have a lifetimes worth of words and often do not see the need to add more. In Greenstone, there is a large volume of technical words such as plugins, metadata, classifiers and indexes, according to my studies. These words are often too much for seniors and can turn a senior person off using the software. The best way to combat this is to use common language equivalents of problematic words.
In the new Greenstone interface I replaced the hardest to understand words with short descriptions of a few words. For example, 'Phind' became 'Phrase Searching' and 'Format Features' became 'Customise metadata'. This simplifying of the terms is designed to increase the usability of the interface by putting the senior user at ease. Complicated terminology can be very confusing to a senior person and can start to agitate them, whereas descriptive sentences like the aforementioned do not.

9.5 Rule Four: Removal of Unwanted Options and Task Simplicity

Another aspect of the Greenstone interface that can confuse senior users is when too much information is presented. If there is excessive unnecessary information present then senior users can become distracted and confused. A lot of seniors take the view that all information is important and therefore they must pay attention to all information. This can be detrimental to a senior's ability to use an interface, as too much information can make the interface seem more complicated than it is and discourage the user from using it. For example, when adding a classifier Appendix B to a collection there are parameters that the user may change if they wish. Senior users view these parameters as essential to the use of the classifier when they are in fact optional parameters.

In the case of the Greenstone software, a lot of effort has been put into making the software come with default settings so that the user needs only change parameters if they want to customise something in particular. I found from the Greenstone Usability study that senior users preferred to keep the default options, and felt that this was sufficient for their uses. Therefore I designed the interface (in the case of classifiers) to include only the default options with the addition of only one option which users deemed to be useful, which was buttonname (buttonname lets the user specify the title the classifier will appear under I the final collection). All other non-default options were removed. This removal of extra options has in fact simplified the task of adding a classifier, which in turn should make the interface more usable.

The removal of unwanted objects did not appear only in the classifiers. In fact, one of the core panes of the interface was removed. The Download pane was found to be too complex for senior users to use, and was consequently confusing to them. The removal of this pane has no effect upon the users ability to create a collection, and in fact the may enhance the interface as the user is not confused by an option they do not know how to use.

While objects may have been removed from the senior interface for the GLI, there still exists four other GLI interface modes in Greenstone, and the user can easily navigate between them and have these options once again available for use in their collection.

9.6 Rule Five: Consistent Layout of Interface

Previous research has suggested that senior users prefer an interface that has a consistent layout [1]. One of the biggest aspects of an interface layout is whether it is vertically or horizontally oriented. Seniors find it easier to locate an object if similar objects on another screen are located in a similar area. This means that important buttons are located in the same place on each page. Greenstone does have some failings in this area as important buttons on the gather pane (such as Add New Folder and Recycle Bin) are located at the bottom of the Gather page and important buttons on the create pane (such as Build Collection and Preview Collection) are located in the middle of the page.
In the new Greenstone interface for seniors these buttons still are not located in the same area, but they are more logically placed. The build buttons (Build Collection, Cancel Build and Preview Collection) are now located on the left hand side of the page, the same place as the collection tree on the Enrich pane and the options on the Design and Format panes. Another issue with the layout of Greenstone is that each pane is split differently. Some panes are split vertically while others are split horizontally. This can cause confusion for a senior user as the have to change the orientation of how they move on the page.

By having the Create pane split vertically and the build buttons on the left hand pane, the new Greenstone interface is keeping a consistent layout. Now when a user goes to a pane they have not been to before, they will know that the main options will be down the left hand side of the page, as this is true for all panes. This consistency can help reassure a user about their use of an interface and can reinforce their confidence in their ability to use the interface.

9.7 Conclusion

This chapter has looked at the effectiveness of the design changes that were made to the GLI, Chapter 6. While a usability study to test the new GLI would have been my preferred method of evaluation, participant and time constraints meant that this method of assessing the interface by a set of design rules was necessary.

However this assessment of the GLI does effectively show how the changes can make Greenstone a much more usable piece of software for senior users.

T his evaluation has shown that the new senior interface can surpass the old interface in areas of accessibility, task complexity, layout and general usability. The new layout of the GLI means that important buttons or messages are easy to find and the use does not have to go searching all over the page to find what they want. The simplification of task complexity means that senior users can now, more confidently, use advanced features of Greenstone, such as classifiers. This new interface design will be a much easier for senior users to use and understand so that they may create their own digital collections.

Chapter 10

Conclusion

In this thesis I have covered previous research in to the usability of interfaces for senior users. This thesis is not about designing user interfaces for seniors, it is about re-designing an existing piece of software to make it usable for senior users. This task can be a lot more complex than if I were to build a piece of digital collection software specifically for senior users. Instead I have to deal with an existing system and code. This has been a difficult task as many of the panes that I redesigned required extensive coding to bypass the existing code, while not destroying the functionality of the software.

After two intensive studies I had a long list of usability issues that senior users had with the existing Greenstone Librarian Interface. The issues ranged from poor layout to understandings of terms and even included colour schemes. All of these issues can impact a senior users ability to use a piece of software, however I have also discovered that not all of these issues are as much of a problem as they first appear.

by comparing the requirements of a user interface for seniors as inferred from literature in the area of senior usability, I came to the conclusion that the new Senior mode interface for the Greenstone Librarian Interface is significantly easier to use.

While the new senior GLI is easy to use by seniors that does not mean that others users can not use it. In fact, lots of users from every age group, especially children and people with minimal physical and learning disabilities will find the new interface easier to use than the old interface. It is also good to keep in mind that while the senior interface has some limitations in it is functionality, i.e. the removal of some features, there is nothing stopping the user learning to use Greenstone using the senior mode and later graduating to the librarian mode or even further. There are of course, with any project, aspects of my original re-design plan that I could not implement for varying reasons. I discuss some of the these design ideas in the next

chapter, future work.

In summary I have discovered a lot about senior usability and re-designing a piece of software for a specific user group. Seniors are very punctual and concise users who try not to make any mistakes, but if they do make mistakes they can easily become lost and get frustrated. And while senior users are very helpful with suggestions in a usability study, I also discovered how hard it is to recruit enough participants and in the end only had enough people fro two of my original three planned studies. When designing for senior users it is important to keep in mind that the design needs to be simple, logical and well explained. If an interface keeps to these three golden rules it should be an interface that seniors can use and enjoy.

Chapter 11

Future Work

While a lot of development of the GLI has been performed for this thesis, there are still many things I wish I had had time or participants to do.

The final senior interface is designed to be more usable for senior users, however due to time and participant constraints I could not directly test this by repeating the Greenstone Usability study with the new interface on a group of senior users. This would be the most definitive test as to the effectiveness of the re-designed interface on the ability of a senior user to use the interface. For this study I would suggest repeating the Greenstone Usability Study without alterations, except where a step or task has been removed or significantly modified. This should give some results which are easily comparable to the data presented I this thesis, ideally task times and in particular interest build times and their trends. An issue brought up throughout this thesis was to do with senior users having trouble understanding complex wording and terminology. While I found the current greenstone help feature to be sufficient in providing the senior users with the help needed, and decided on not modifying it for this thesis, there are some additions that I would suggest be added in the future. As the new interface is designed for senior users, the average computer experience of a senior user must be taken into account when thinking about a help guide. Some of the participants I came across in the Greenstone Usability study, although classed as having moderate computer skills for this study, had some gaps in their knowledge. In particular one user was not sure of when to use a single left mouse button click and when to use a double mouse button click. In future I would suggest a simple guide to the interface suggesting when such actions as single clicks, double clicks, highlighting and other actions are required. This addition to the existing help guide should provide the users with the background of how to work the greenstone interface and hopefully fill any existing gaps in their knowledge. Another useful addition that came to my attention and I would suggest be included

in the future was the suggestion of a glossary. Although the new greenstone interface discussed in this thesis has had a lot of the complex wording replaced, not all terms had an alternative. For example, no alternative term for metadata was found. A glossary would provide the users with easy access to an index of terms so that they may quickly find the meaning of a term without having to trawl through the help files. Earlier in this thesis I discussed RedRock, a colour scheme for the GLI that was designed with senior users and their sight troubles in mind. Due to user preference and a lack of usability issues from my two studies (Chapter 3 and Chapter 5) with the current colour scheme RedRock was not implemented. However, while the participants in the Greenstone Usability study preferred the current green and blue screen they cannot speak for all senior users. To accommodate all possible users I would suggest having an option, such as a combobox, to choose between the two colour schemes. this option would most likely be implemented in the Preferences menu along with the font and other interface settings.

Appendix A

Personal Collection Study

A.0.1 Booklet

Personal Collection Study The purpose of this study is to discover what items you would like to organize into a collection that represents your lifes work or your hobby. These items could be any item that you think is an important part of your life or hobby such as a marriage certificate, posters, photographs or letters.

Imagine that you are creating a collection of documents about your life or hobby and think of some important items you would like to include in it.

These items could be any type of memorabilia such as paper documents, LPs, cassettes, old movies and photos. If there is an item that you think you would like to add to the collection, no matter the format, then complete the following activity.

Some example items are: Diaries Letters Photos Paper Documents (certificates, ration cards etc) Home Video Cassettes CDs LPs Sheet Music Books Electronic documents

For items that you cannot fit into the Keepsake box, or for some other reason you cannot retrieve them, then write a description on a sticky note and put it in your scrapbook with a description of why it cannot be included in the box. If possible the researcher will take a photo of this item at the end of the study.

Activity:

Every three days gather six items that you wish to add to your collection then write a description of each item on a sticky note and attach the sticky note to the item. Then place the items in your Keepsake box. If the item is too large or awkward to put in the box or for some other reason can not be retrieved, then put the sticky note in your scrap book and record where you keep the item. This is so that the researcher can take a photo of the item in the final meeting, if possible.

An example sticky note describing a family photograph. Along with this booklet is a series of items to be used in the study. Here I will discuss what each item is for. Keepsake box: This box is for you to put any items that you wish to add to the collection in. This box is to be brought to the final meeting.
Sticky notes: These notes are for you to write descriptions of the items on and then attach to the item. These sticky notes are easily removable, but please be careful when attaching to photos as the glue can sometimes leave a mark Pens: For writing on the sticky notes and in the scrapbook.
Scrapbook: In this you put sticky notes of items which you cant put in the Keepsake box. You can also use this to record any other notes you want to make about the study or your experience.
All of the above items are to be returned to the researcher at the end of the study. None of your personal items will be kept by the researcher, however photos will be taken of the items if you approve. You will not need to do the following until you meet with the researcher in the final meeting, however you may read through it now if you wish.

On the card provided you will be asked to create an outline of how you would like the collection to appear. For each item you have collected we would like you to write a brief description of the item then organize them into sections. Part of a completed collection outline
A brief description of the documents, such as Marriage Certificate or Bob's adoption papers. When you wish to add an item to your outline, write a brief description of the item on a mini sticky note and place it on the diagram in the section where you would like it. The idea of this is to find out how you would like the collection organized, by thinking about what items you would like grouped together and why. For each section please print clearly the name of the section, such as 'Career' or 'Family'. The results of this study are anonymous; the only person who will know who you are is the researchers.

Appendix B

Greenstone Usability Study

B.0.2 Session One

Introduction

Traditionally collections are stored on microform, in print or simply in a box. However, as the 21st Century leads us into a new technological world we are presented with new ideas and methods of performing old tasks. A Digital Library is a collection of items that have an underlying relation to each other. Such collections can be about a cricket club's history, or your own personal history, for example.

With the ability to transform many items in life into an electronic equivalent we are presented with the opportunity to create such collections in a digital format. For this purpose there exists software for creating these digital collections. One such piece of software is called Greenstone. Created at the University of Waikato by the team in the New Zealand Digital Library Project, it has been used to create educational and personal collections that are then sent all over the world.

The following tutorial will take you through the basics of how to use the Greenstone software. The tutorial will be run in stages. Each stage is designed to take one and a half hours, however the stages can be further split up if required.

At points throughout the study the researcher will ask you some questions about your experience with a specific task or your experience with the software so far. Introduction Traditionally collections are stored on microform, in print or simply in a box. However, as the 21st Century leads us into a new technological world we are presented with new ideas and methods of performing old tasks. A Digital Library is a collection of items that have an underlying relation to each other. Such collections can be about a cricket clubs history, or your own personal history, for example.

With the ability to transform many items in life into an electronic equivalent we are presented with the opportunity to create such collections in a digital format. For

this purpose there exists software for creating these digital collections. One such piece of software is called Greenstone. Created at the University of Waikato by the team in the New Zealand Digital Library Project, it has been used to create educational and personal collections that are then sent all over the world. The following tutorial will take you through the basics of how to use the Greenstone software. The tutorial will be run in stages. Each stage is designed to take one and a half hours, however the stages can be further split up if required.

At points throughout the study the researcher will ask you some questions about your experience with a specific task or your experience with the software so far. Stage One Greenstone is a piece of software for building digital libraries. Digital libraries are a collection of digital items organised in some fashion. A Digital Library can be published on the internet or distributed amongst acquaintances by CD-ROM. In this study you are going to be taken step by step through how to use Greenstone, taught about some of its options and asked to complete some tasks.

The researcher will be with you at all times so that you may ask any questions. Out of this study the researcher aims to gain an insight into which tools in Greenstone senior users would like to use and which are cumbersome and unnecessary. The researcher also aims to gain your opinion of the current interface and its design. The way in which the researcher will gain this information is by question periods that are set out in each session. After you have completed certain tasks the researcher will ask you some questions. This study is not a test. It is an exploration study which means there are no wrong answers. The researcher wants to know what you think of the software and how you use it so any comments or opinions you may have are welcome. Exploring a digital collection

Click on the windows Start button then click on All Programs.

Find Greenstone 3 Digital Library Software v3.02

Select Greenstone 3 Digital Library

A browser window should open. This page lists all the digital libraries that are on your computer.

Click on Introduction Collection

For now we will explore what a digital library looks like when it is built. You are to just explore and discover what a Digital Library can do. The researcher can help you at any point and answer any questions you may have. Browse

In this section you can browse the collection using different methods. Browsing is a good way of seeing what types of documents and what information the collection contains. Later you will learn how to specify more methods but for now you have these two methods of titles and filenames.

When browsing by titles, you can look at all the documents in alphabetical order based upon the title of the document. i.e. Shakespeares life and Budget When browsing by filename, the documents are alphabetically ordered by the name of the file, i.e. Shakespeare.doc or my budget.PDF

Click on Browse

Click on titles

This lists all the documents in the collection, alphabetically sorted by their title. The title is written next to the document.

Click on filenames

This lists all the documents in the collection, alphabetically sorted by their filenames. The filename is written in brackets under the title.

Questions

Do you think the browsing section of Greenstone is useful?

What did you think of the methods with which you can browse a collection?

Can you think of any other ways a person could explore the collection?

Text Search

In this task we will be using the text search option. This option allows you to search all the documents in the collection for a specific word. We will also try searching for a specific word using both lower and uppercase letters.

Using the box at the bottom of the page you can type a word or words to search the documents for. You can also specify which part of a document you want to search for the word in. For example you can search in the document itself, the title of the document or even the filename of the document.

Click on Text Search

In the box next to where it says Query String type Located

Click on the Search button

Click on the box next to where it says Turn casefolding and select off from the options.

In the box next to Query String type located making sure the l is lower case.

Click on the Search button again

Click on the box next to where it says Match and select all from the options.

Click on the Search button again

Questions

Did you find any part of this section to be problematic?

Which features do you think you are unlikely to use?

What did you think of how the page was set out (where options were placed)?

Form Search

This section is similar to the previous section except that using Text Search you can not search in multiple areas of a document. The previous section allowed you to search in the text or titles or filenames fields. You could not search in text AND filenames or titles AND text, etc this section allows you search in the different fields at once and return a document that has what you are searching for in the specific fields. For example you may want to search for Shakespeare in the text of the document and search for Comedy in the title.

You may also search for phrases, however we will discuss phrase searching in more detail later. In this particular task we will be searching for a document that has specific words in the text and the title.

Click on Form Search

In the first free box under Word or Phrase type Shakespeare

Make sure that out of the option in the box next to this one that the selected option is text

In the next free box under Word or Phrase type Comedy

In the option box next to this box set the selected option to be titles

Click on the Search button

Questions

Do you think you would explore a collection in this manner?

Do you think this type of search would be useful for someone using a digital library?

B.0.3 Session Two

Stage Two

In this stage you will be learning how to open an existing collection and modify it. You will then learn how to create a small collection of your own.

Creating your own collection

In the first part of this task we will go through how to open an existing collection, then we will go through the process of creating a new empty collection.

Click on the windows Start button then click on All Programs.

Find Greenstone 3 Digital Library Software v3.02

Click on Greenstone 3 Digital Library

Click the Enter Library button

Click on the windows Start button then click on All Programs.

Find Greenstone 3 Digital Library Software v3.02

Click on Greenstone Librarian Interface

Go to File then select Open

In the new window select Introduction Collection

Have a look at what has changed on the screen

Then click on Open

This is what a collection looks like before we build the collection. Building a collection is where all the information we have provided is used to make the collection look nice and easy to use for your family and friends. It will end up looking like the Introduction collection that we explored in the first session.

Go to File then select New

In the Collection Title box type My First Digital Collection

In the Description of Content box type This is my first digital collection

Press the OK button

You have now created a new collection. Currently this collection has no documents in it, we will discuss how to add documents in the following tasks.

Questions

Is there anything in this section so far that you found to be problematic?

What did you think of the options you were given when creating a new collection?

The right hand side of the window has now changed colour; you can now work in

this area. But first we need to add some documents to the collection.

Adding documents to your collection

In this task we will add a file to our digital collection.

On the left hand side of the screen double click on Home Folder (ekb2)

This will let you see all the files on your computer

Then double click on Desktop

Then double click on Churchill

Click on quotes.doc and drag it to the right hand side of the screen

Questions

Did you understand what the + and symbols meant?

Did you like the way you could drag the file across the screen?

Was any part of this process a problem for you?

Would you think a button saying add to collection would be better than dragging the file across the screen?

Could you tell what was a selected item or and what was not?

Building the collection

Building is a term used to refer to when the software makes a collection look nicer, like how the Introduction Collection appeared. In this task we will perform the process of building our digital collection.

Click on the Create tab

Click the Build Collection button

Once the process is finished click OK on the box that pops up

Now select Preview Collection

A browser window will open up and you can now view your collection.

Click Browse

Then click filenames

Here you can see the document you added in the previous task.

You have just created your first Digital Library. Congratulations! Questions

Is there anything you want to comment on about what you have just learnt?

Metadata

Metadata is a term we use when referring to a description about an item. Imagine you have a small library of your own and you are creating a list of all your books based upon their author. You go through and list the title of the book, the author

and where in your library you can find the book (i.e, by the door on the second shelf). These descriptive details are called metadata.

In this next section we will show you how to use metadata with a digital collection.

Now click on the Enrich tab

Click quotes.doc on the left hand side of the screen, if it isn't already highlighted.

On the right hand side of the screen click on dc.title

The box next to it is now has a cursor.

Type Quotes by Winston Churchill

Have a look at all the other items in the list. The researcher will describe to you what most mean.

Click on the Create tab

Click the Build Collection button

Once the process is finished click OK on the box that pops up

Now select Preview Collection

A window will open up and you can now view your collection.

Click Browse

Then click filenames

There is the document you just added with the title you just entered Quotes by Winston Churchill

You have now added metadata to your collection.

Questions

Did you find it easy to locate the enrich tab?

Do you find metadata to be a difficult concept to understand?

If yes, how would you explain metadata in your own terms?

Was it confusing at all when you rebuilt the collection?

Rebuilding

Every time you modify something in your collection you need to build the collection again. This is called rebuilding a collection. You do this by repeating the process by which you first created the collection:

Collection building process

Click on the Create tab

Click the Build Collection button

Once the process is finished click OK on the box that pops up

Now select Preview Collection

A window will open up and you can now view your collection.

B.0.4 Session Three

Stage Three

Creating a large collection

In this following task we will create a new collection, larger than our first collection, and add lots of files to it.

Click on the windows Start button then click on All Programs.

Find Greenstone 3 Digital Library Software v3.02

Select Greenstone 3 Digital Library

Click Enter Library

Click on the windows Start button then click on All Programs.

Find Greenstone 3 Digital Library Software v3.02

Select Greenstone Librarian Interface

Go to File then select New

In the Collection Title box type My Big Collection

In the Description of Content box type This is a big collection

Press the OK button

On the left hand side of the screen click on Home Folder (ekb2)

Then double click on Desktop

Then drag the folder called Hillary in to the right hand side of the screen.

You have now added multiple documents to a collection called My Big Collection. If you click on Hillary in the right hand side of the screen it will list all the documents in the collection. Greenstone includes a tool which looks at a document and finds out some information about the document. This is a complex process that is done automatically so you do not need to know anything about how it is done. This information is then included in the metadata, but it is different from the metadata that we used before. Metadata that is extracted automatically, as just mentioned, is listed as ex.Title and ex.Description and so on, whereas the metadata we are entering is called dc.Title and dc.Description etc

You just need to remember that the ex.Title and dc.Title are not the same thing.

Go to the Enrich tab

Double click on Hillary so that you can see each file

Click on hillary.htm and then click on dc.Title

Type Images from Sir Edmund Hillarys life

Click on the Create tab

Click Build Collection

Preview the collection

Click on Form Search

Type Sir Edmund into the first box

Select dc.Title from the options list to the right of the box

Press the Search button

In the second box type hillary and select filenames from the options list

Press the Search button again

Now only documents that have the title Sir Edmund and the filename hillary will show up as a result. Using this method you can search for documents using multiple pieces of information. The researcher will explain each of the options in the options list.

Questions

What did you think of the process of adding multiple metadata?

Do you think there are any problems with it?

Do you think metadata is something that could be useful?

What did you think of searching using titles and filename?

Do you think searching using forms would be a useful option for a collection you had created?

Maximum documents

In this task we will explore how you can limit the number of documents that are included in your collection when you build. This option is very useful if you have a collection with lots of documents but you want to test how something looks. Building a collection with lots of documents can take a long time, but if we limit the number of documents included when we build then we can build the collection quickly and test the changes you made.

Go back to The Librarian Interface

Click on the Create tab

Click the box that says maxdocs

In the box to the right click the little arrow up so that the number is 5

Click the Build Collection button

Click OK

Click on the Preview collection button

Click on the Create tab

Click the box that says maxdocs

In the box to the right type the number 10

Click the Build Collection button

Click OK

Click on the Preview collection button

Questions

How do you find the size of the boxes where you select an option? Too small, too large or just right?

When changing the maximum number of documents in the collection, how did you find the arrow sizes?

In your opinion was it better to set the number of documents using the arrows or typing the number into the box?

Do you think this option of limiting the number of documents in a collection would be useful?

Add a Browsing Classifier Phrase Searching

Phrase searching is where you are searching for a specific series of words in a specific order. This is commonly a single sentence. This differs from normal search as normal text search looks for words individually not taking into account in what order they are found. For example if you wish to search for My very first birthday you would use phrase searching, however if you were searching for First Birthday you could use normal search as it does not matter in which order the words are found in a document.

Click on the Design tab

Click on Browsing Classifiers

Click where it says Select Classifier to add

In the options box next to this select Phind

Then click the Add Classifier button

The researcher will explain some of the options presented in this window.

Press the OK Button

Click on the Create tab

Click the Build Collection button

Click OK

Click on the Preview collection button

Click on Phrase browse

In the box type Mount Everest is in Nepal

Click the Search button

The researcher will explain to you what the results mean.

Questions

Do you think phrase searching would be useful in any collection you would make?

How do you think phrase searching could be made easier?

Appendix C

Demographic Questionnaire

Demographic Questionnaire Age

65-70 70-75 75-80 80-85 85-90 90+

Highest educational achievement?

* Higher School Certificate

* University Entrance

* Bachelors

* Higher degree

If not any of the above, how many years of school did you complete?

What is or has been your main occupation?

Health

Do you have any physical condition that may affect your use of a computer?

Yes / No

If yes please briefly describe the condition.

Do you wear contacts or glasses?

Yes / No

If yes, does this affect your use of a computer at all? Briefly describe.

Computer Use

How would you describe your general computer skills?

Very Poor 1 2 3 4 5 Expert

How long have you been using a computer?

How do you find the use of a mouse?

Very Difficult 1 2 3 4 5 Easy

What are some major troubles you have when using a computer?

Which of these methods did you primarily learn your computer skills from?

* Family and friends

* Self-taught

* SeniorNet or other classes

* Work related

Other

Do you have any other comments or observations about your computer use or this study? Did you find anything particularly easy?

Appendix D

The re-design process

In this appendix I discuss how I implemented the design changes to the GLI. While it is impossible to describe all of the changes, this section describes some of the most important ones.

D.1 Working with existing software

Greenstone has been around for over a decade. It was created at the University of Waikato in the New Zealand Digital Library Project. The fact that for this thesis I am working with an existing piece of software, and not creating a new piece of software for senior users, has lost of implications. The first being that I have very little control about the features that can be included in the new interface, as some of the features of greenstone are necessary for it's use. Instead I have to make any design changes work around the features, such as adding a classifier. If I had been designing the software and not re-designing it I would have designed this as a much simpler task.
However there is a lot of flexibility involved in re-designing an existing piece of software.

D.2 spacing

All of the greenstone panes had very tight spacing and many objects ran right to the edge of the screen. This was identified as a usability issue for senior users. After some experimentation with border sizes came up with the distances for spacing in the panes. I had decided to give the border that goes around the main panel (contains all the objects in the panel) of each pane a spacing to 10 pixels form the outside of the applet. To implement this I had to access the java files for each pane, and

for the manager (arranges the objects within the pane) of each pane. In each panes java file I had to create an empty border with a distance of 10 pixels and apply this border to the pane. However I quickly encountered a problem as the new spacing wasn't shown. After a lot of frustration I discovered that as the panes were using a BorderLayout manager, every location (North, East, South, West and Center) had to have an object assigned to it before the new border could take effect. I found this to be a bit of a design flaw on the original GLI, but quickly fixed the problem by adding an empty JLabel to the unoccupied location. This modified spacing was then applied to all the panes and dialog boxes in the GLI.

D.3 Wording

It has been discussed I this thesis how complex wording can confuse a senior user and needs to be replaced by plain English alternatives. The way in which I did this in the Senior GLI was by creating a copy of the original Greenstone dictionary that contains all the records all the text used in greenstone, for dialogue's, buttons and labels. I then devised plain English alternatives to the most difficult terms (see figure 6.2). I then specified that if the current interface mode was Senior, this new dictionary file was to be used.

D.4 Format Features table

The original Format features pane was complex to use as the user had to know the XML language. I decided to set up an interface that gave the user a set of pre-defined alterations for the metadata (see section 6.9.7). These alterations were implemented using a table that I had made a year earlier. This table had custom renderers and checkboxes so that the user could simply change how the metadata appeared in the finished collection. The new metadata was then formatted using a java file that parsed the collections configuration file and inserted the new formatting tags to the correct classifier and metadata item.

D.5 Senior Metadata Set

Creating the senior metadata set was a simple task from a developers point of view. Greenstone comes packaged with a metadata set editor that is a separate applet from the GLI and the Greenstone Library. The metadata set editor lets the user edit existing metadata sets or create new ones. I used this metadata set to create the senior metadata set that is described in this thesis (chapter 7).

D.6 Re-alignment of Gather Pane

During the Greenstone Usability Study 5 a user was having difficulty reading the text on the screen so they maximised the GLI. When they maximised the screen the two panels on the gather pane, changed position. Where they had been evenly spaced across the page before maximisation, the left pane now had about two thirds of the screen. This alignment issue seemed to me to be an oversight in the original development of Greenstone. For general usability, not just for seniors, I re-weighted these panel so that they had an even amount of screen space no matter the resolution of the GLI.

D.7 Addition of Senior Mode option

One of the reasons for my decision to use greenstone for this thesis was that the environment already contains four different interfaces for greenstone. To switch between these interface, known as modes, the user can go the to the File menu and select preferences. In the preferences window there is a tab called mode where the user can change the mode. This feature means that I can implement the senior interface as another mode option and not have the new interface affect the current usability of greenstone for other users.

To set up the ability for the user to switch mode I first had to modify the java file Preferences in greenstone so that a fifth option was entered. This included creating a new mode in the Configuration class, which record the basic options of greenstone. In the configuration class the mode is simply a constant integer that can be assigned to the mode variable of the class. Once the new senior mode option was created in

the configuration file it was a simple matter of adding a fifth radio button. From there it was a simple addition to greenstone's dictionary, a text file that records all the text used in greenstone, such as appears in dialog boxes and on buttons.

Bibliography

[1] P.B. Baltes and R. Kliegl. Further Testing of Limits of Cognitive Plasticity: Negative Age Differences in a Mnemonic Skill Are Robust. *Developmental Psychology*, 28(1):121–25, 1992.

[2] M.F. Costabile. Usability in the Software Life Cycle. *Handbook of Software Engineering and Knowledge Engineering*, 1:179–92, 2001.

[3] Hawthorn D. Designing for older users: Display quality versus task complexity. *Australasian Computer Human Interface Conference. Sydney.*

[4] K. Fenton and P. Malcolm. Who said you cant teach an old dog new tricks? a study of seniornet in new zealand. *New Zealand Journal of Applied Computing and Information Technology*, pages 16–21, 2001.

[5] Arthur D. Fisk and Wendy A. Rogers. Handbook of human factors and the older adult. Technical report, 1997.

[6] Bill Gaver, Tony Dunne, and Elena Pacenti. Design: Cultural probes. *interactions*, 6(1):21–29, 1999.

[7] D. Hawthorn. Cognitive aging and human computer interface design. *Computer Human Interaction Conference, 1998. Proceedings. 1998 Australasian*, pages 270–280.

[8] D. Hawthorn. Possible implications of aging for interface designers. *Interacting with Computers*, 12(5):507–528, 2000.

[9] D. Hawthorn. Running software usability studies with older users. *Proc. 37th Annual Conference of the Ergonomics Society of Australia Better Integration: Bringing Research and Practice Together, M. Stevenson & J. Talbot, eds*, pages 121–126, 2001.

[10] D. Hawthorn. Towards Interface Design for Older Users. *New Zealand Journal of Applied Computing and Information Technology*, 6(1):26–36, 2002.

[11] D. Hawthorn. *Designing Effective Interfaces for Older Users*. PhD thesis, The University of Waikato, 2006.

[12] R. Holtzer, Y. Stern, and B.C. Rakitin. Age-related differences in executive control of working memory. *Memory & Cognition*, 32(8):1333–1345, 2004.

[13] S. Keates and P.J. Clarkson. Countering design exclusion through inclusive design. *Proceedings of the 2003 conference on Universal usability*.

[14] RW Morrell and KV Echt. Designing written instructions for older adults: Learning to use computers. *Handbook of human factors and the older adult*, pages 335–361, 1997.

[15] N. Sheehy. User-interface requirements for elderly people. Technical report, Technical report, School of Psychology, The Queens University of Belfast, 2000. http://www. qub. ac. uk/tbe/arc/research/projects/equal. html.

[16] C. Stephanidis. *User Interfaces for All: Concepts, Methods, and Tools*. Lawrence Erlbaum Associates, 2001.

[17] S. Weibel, J. Kunze, C. Lagoze, and M. Wolf. Dublin core metadata for resource discovery, 1998.

[18] M. Yanagisawa and K. Akahori. The Effect of Visual Discontinuity on Spatial Cognition. *Transaction of Human Interface Society*, 1(1):37–44, 1999.

[19] M. Zajicek. Interface Support for Elderly People with Impaired Sight and Memory. *Proceeding of the 6th European Research Consortium for Informatics and Mathematics Workshop on User Interfaces for All*, pages 177–182, 2000.